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(54) NEW COMPOUND AND ORGANIC LIGHT EMITTING DEVICE USING THE SAME(8)

NEUE VERBINDUNG UND DIESE VERWENDENDE ORGANISCHE LICHTEMITTIERENDE VORRICHTUNG (8)

NOUVEAU COMPOSE ET DISPOSITIF ELECTROLUMINESCENT ORGANIQUE UTILISANT UN TEL COMPOSE (8)

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- **TRITSCHLER W ET AL: "SYNTHESE UND KONFORMATION VON SPIROACRIDANEN// SYNTHESIS AND CONFORMATION OF SPIROACRIDANS" CHEMISCHE BERICHTE, VERLAG CHEMIE GMBH. WEINHEIM, DE, vol. 117, 1 January 1984 (1984-01-01), pages 2703-2713, XP008051454 ISSN: 0009-2940**
- **TRITSCHLER ET AL. CHEMISCHE BERICHTE vol. 117, no. 8, 1984, pages 2703 - 2713, XP008095206**

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Description

Technical Field

[0001] The present invention relates to an organic light emitting device which comprises a fluorene derivative capable of significantly improving a lifespan, efficiency, and electrochemical and thermal stabilities thereof.

Background Art

[0002] An organic light emission phenomenon is an example of a conversion of current into visible rays through an internal process of a specific organic molecule. The organic light emission phenomenon is based on the following mechanism. When organic material layers are interposed between an anode and a cathode, if voltage is applied between the two electrodes, electrons and holes are injected from the cathode and the anode into the organic material layer. The electrons and the holes which are injected into the organic material layer are recombined to form an exciton, and the exciton is reduced to a bottom state to emit light. An organic light emitting device which is based on the above mechanism typically comprises a cathode, an anode, and organic material layer(s), for example, organic material layers including a hole injection layer, a hole transport layer, a light emitting layer, and an electron transport layer, interposed therebetween.

[0003] The materials used in the organic light emitting device are mostly pure organic materials or complexes of organic material and metal. The material used in the organic light emitting device may be classified as a hole injection material, a hole transport material, a light emitting material, an electron transport material, or an electron injection material, according to its use. In connection with this, an organic material having a p-type property, which is easily oxidized and is electrochemically stable when it is oxidized, is mostly used as the hole injection material or the hole transport material. Meanwhile, an organic material having an n-type property, which is easily reduced and is electrochemically stable when it is reduced, is used as the electron injection material or the electron transport material. As the light emitting layer material, an organic material having both p-type and n-type properties is preferable, which is stable when it is oxidized and when it is reduced. Also a material having high light emission efficiency for conversion of the exciton into light when the exciton is formed is preferable.

[0004] In addition, it is preferable that the material used in the organic light emitting device further have the following properties.

[0005] First, it is preferable that the material used in the organic light emitting device have excellent thermal stability. The reason is that joule heat is generated by movement of electric charges in the organic light emitting device. NPB, which has recently been used as the hole transport layer material, has a glass transition temperature of 100°C or lower, thus it is difficult to apply to an organic light emitting device requiring a high current.

[0006] Second, in order to produce an organic light emitting device that is capable of being actuated at low voltage and has high efficiency, holes and electrons which are injected into the organic light emitting device must be smoothly transported to a light emitting layer, and must not be released out of the light emitting layer. To achieve this, a material used in the organic light emitting device must have a proper band gap and a proper HOMO or LUMO energy levels. A LUMO energy level of PEDOT:PSS, which is currently used as a hole transport material of an organic light emitting device produced using a solution coating method, is lower than that of an organic material used as a light emitting layer material, thus it is difficult to produce an organic light emitting device having high efficiency and a long lifespan.

[0007] Moreover, the material used in the organic light emitting device must have excellent chemical stability, electric charge mobility, and interfacial characteristic with an electrode or an adjacent layer. That is to say, the material used in the organic light emitting device must be little deformed by moisture or oxygen. Furthermore, proper hole or electron mobility must be assured so as to balance densities of the holes and of the electrons in the light emitting layer of the organic light emitting device to maximize the formation of excitons. Additionally, it has to be able to have a good interface with an electrode including metal or metal oxides so as to assure stability of the device.

The document WO 2004/020371 discloses fluorene compounds wherein the two benzene rings are substituted with arylamine moities. These compounds are applied in organic light-emitting devices in the light emitting layer or as hole transporting material.

The document US 2004/0219386 discloses triarylamine derivatives suitable as hole-transporting materials in organic light-emitting devices.

[0008] Accordingly, there is a need to develop an organic light emitting device including an organic material having the above-mentioned requirements in the art.

Disclosure of Invention

Technical Problem

[0009] Therefore, the object of the present inventions is to provide an organic light emitting device which is capable of satisfying conditions required of a material usable for an organic light emitting device, for example, a proper energy level, electrochemical stability, and thermal stability, and which includes a fluorene derivative having a chemical structure capable of playing various roles required in the organic light emitting device, depending on a substituent group.

Technical Solution

[0010] The present invention provides an organic light emitting device which comprises a first electrode, organic material layer(s) comprising a light emitting layer, and a second electrode, wherein the first electrode, the organic material layer(s), and the second electrode form a layered structure and at least one layer of the organic material layer(s) includes a compound according to claim 1.

Brief Description of the Drawings

[0011] FIG. 1 illustrates an organic light emitting device comprising a substrate 1, an anode 2, a light emitting layer 3, and a cathode 4; and

[0012] FIG. 2 illustrates an organic light emitting device comprising a substrate 1, an anode 2, a hole injection layer 5, a hole transport layer 6, a light emitting layer 7, an electron transport layer 8, and a cathode 4.

Best Mode for Carrying Out the Invention

[0013] Hereinafter, a detailed description will be given of the present invention.

[0014] Various substituent groups are introduced into a core structure shown as defined in claim 1.

[0015] Furthermore, the compound of Formula 1 may be used to form the organic material layer using a vacuum deposition process or a solution coating process during the production of the organic light emitting device. In connection with this, illustrative, but non-limiting, examples of the solution coating process include a spin coating process, a dip coating process, an inkjet printing process, a screen printing process, a spray process, and a roll coating process.

[0016] For example, the compound as defined in claim 1 has excellent solubility to a polar solvent, such as xylene, dichloroethane, or NMP, which is used during the production of the device, and forms a thin film very well through the process using a solution, thus the solution coating process may be applied to produce the device.

[0017] Tertiary alcohol, which is produced by a reaction of a lithiated aryl and keto group, is heated in the presence of an acid catalyst to form a hexagonal cyclic structure while water is removed, thereby producing the compound having a spiro structure according to the present invention. The above-mentioned procedure for producing the compound is well known in the art, and those skilled in the art can change the production conditions during the production of the compound as defined in claim 1. The production will be described in detail in the preparation examples later.

[0018] In the organic light emitting device of the present invention, a compound, in which a thermosetting or photo-crosslinkable functional group is introduced into the compound of Formula 1, may be used instead of the compound as defined in claim 1. The former compound has the basic physical properties of the compound as defined in claim 1, and may be used to form a thin film using a solution coating process and then be cured so as to form an organic material layer during the production of the device.

[0019] The method of forming the organic material layer, which comprises introducing the curable functional group into the organic material during the production of the organic light emitting device, forming the organic thin film using the solution coating process, and curing the resulting film, is disclosed in US Pat. No. 2003-0044518 and EP Pat. No. 1146574 A2.

[0020] The above documents state that, if the organic material layer is formed through the above-mentioned method using a material having a thermosetting or photo-crosslinkable vinyl or acryl group so as to produce an organic light emitting device, it is possible to produce an organic light emitting device having a low voltage and high brightness as well as an organic light emitting device having a multilayered structure using the solution coating process. This operation mechanism may be applied to the compound of the present invention.

[0021] In the present invention, the thermosetting or photo-crosslinkable functional group may be a vinyl or acryl group.

[0022] The organic light emitting device of the present invention can be produced using known materials through a known process, modified only in that at least one layer of organic material layer(s) include the compound of the present invention, that is, the compound as defined in claim 1.

[0023] The organic material layer(s) of the organic light emitting device according to the present invention may have a single layer structure, or alternatively, a multilayered structure in which two or more organic material layers are layered. For example, the organic light emitting device of the present invention may comprise a hole injection layer, a hole transport layer, a light emitting layer, an electron transport layer, or an electron injection layer as the organic material layer(s). However, the structure of the organic light emitting device is not limited to this, but may comprise a smaller number of organic material layers.

[0024] Furthermore, the organic light emitting device of the present invention may be produced, for example, by sequentially layering a first electrode, organic material layer(s), and a second electrode on a substrate. In connection with this, a physical vapor deposition (PVD) method, such as a sputtering method or an e-beam evaporation method, may be used, but the method is not limited to these

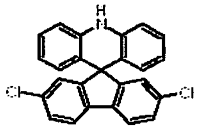
[0025] A method of producing the compound as defined in claim 1 the production of the organic light emitting device using the same will be described in detail in the following preparation examples and examples. However, the following preparation examples and examples are set forth to illustrate, but are not to be construed to limit the present invention.

Mode for the Invention

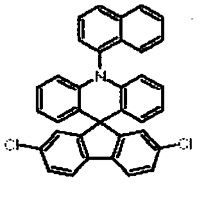
[0026] A better understanding of a method of producing an organic compound as defined in claim 1 and the production of an organic light emitting device using the same may be obtained in light of the following preparation examples and examples which are set forth to illustrate, but are not to be construed to limit the present invention

[0027] In order to produce the compound as defined in claim 1, compounds of the following Formulae, a or b, may be used as a starting material.

[0028]



[Formula a]



[Formula b]

[0029] PREPARATION EXAMPLE 1: Production of a starting material represented by Formula a

[0030] 1) After 10 g of diphenylamine (59 mmol) and 8.04 ml of bromomethyl methyl ether (88.6 mmol) were dissloved in 100 ml of tetrahydrofuran, 12.4 ml of triethylamine (88.6 mmo1) were added thereto. Stirring was conducted in a nitrogen atmosphere for 5 hours, and an organic layer was then extracted using distilled water. The extracted organic layer was subjected to a column separation process at a ratio of n-hexane/tetrahydrofuran of 15:1, and vacuum dried to produce 12 g of tertiary amine (yield 90 %).

[0031] 2) The amine compound produced in 1) (12.0 g, 56.3 mmol) was dissolved in 100 ml of purified THF and cooled to -78°C, and n-BuLi (2.5 M hexane solution, 22.5 ml, 56.3 mmol) was slowly dropped thereon. Stirring was conducted at the same temperature for 30 min, and a 2,7-dichloro-9-fluorenone compound (14.0 g, 56.3 mmol) was added thereto. After stirring at the same temperature for 40 min, the temperature was raised to normal temperature and stirring was carried out for an additional 3 hours. The reaction was completed in an ammonium chloride aqueous solution, and extraction was conducted with ethyl ether. Water was removed from an organic material layer using anhydrous magnesium sulfate, and an organic solvent was then removed therefrom. The produced solid was dispersed in ethanol, stirred for one day, filtered, and vacuum dried. After an intermediate material was dispersed in 100 ml of acetic acid, ten drops of concentrated sulfuric acid were added thereto and reflux was conducted for 4 hours. The resulting solid was filtered, washed with ethanol, and vacuum dried to produce 21.8 g of amine (96.8 % yield). MS: [M+H]+ = 401.

[0032] PREPARATION EXAMPLE 2: Preparation of a starting material represented by Formula b

[0033] A compound of Formula a (9.00 g, 22.5 mmol), 1-iodonaphthalene (11.4 g, 45.0 mmol), potassium carbonate (6.22 g, 45.0 mmol), copper iodide (214 mg, 1.13 mmol), and xylene (250 ml) were heated in a nitrogen atmosphere overnight. After cooling to normal temperature, a product was extracted with ethyl acetate, water was removed with anhydrous magnesium sulfate, and the solvent was removed at a reduced pressure. The resulting product was passed through a silica gel column using a hexane solvent to produce a compound, the solvent was removed at a reduced pressure, and vacuum drying was conducted to produce the compound of Formula b (5.0 g, 42 % yield). MS: $[M+H]^+ = 527$.

[0034] EXAMPLE 1: Preparation of the compound represented by Formula 3-1 1

[0035] 1) Synthesis of arylamine (4-(N-phenyl-N-phenylamino)phenyl-1-phenylamine) to produce the compound represented by Formula 3-1: 13.5 g of 4-bromophenyl-N-phenyl-N-phenylamine (41.6 mmol) and 3.98 ml of aniline (43.7 mmol) were dissolved in 120 ml of toluene, 10.00 g of sodium-tert-butoxide (104.1 mmol), 0.48 g of bis(dibenzylidene acetone)palladium(0) (0.83 mmol), and 0.58 ml of 50 wt% tri-tert-butylphosphine toluene solution (1.25 mmol) were added thereto, and reflux was conducted in a nitrogen atmosphere for 2 hours. Distilled water was added to the reaction solution to complete the reaction, and the organic layer was extracted. A column separation process was conducted using a solvent of n-hexane and tetrahydrofuran at a ratio of 10:1, stirring was conducted using petroleum ether, and vacuum drying was conducted to produce an arylamine connection group (9.6 g, yield 69 %). MS: $[M+H]^+= 336$.

[0036] 2) 4.68 g of compound of Formula b (8.88 mmol) and 6.86 g of 4-(N-phenyl-N-phenylamino)phenyl-1-phenylamine (20.4 mmol) were dissolved in 120 ml of toluene, 5.89 g of sodium-tert-butoxide (61.3 mmol), 0.24 g of tris (dibenzylidene acetone)dipalladium(0) (0.41 mmol), and 0.25 ml of 50 wt% tri-tert-butylphosphine toluene solution (0.61 mmol) were added thereto, and reflux was conducted in a nitrogen atmosphere for 2 hours. Distilled water was added to the reaction solution to complete the reaction, and the organic layer was extracted. A column separation process was conducted using a solvent of n-hexane and tetrahydrofuran at a ratio of 4:1, stirring was conducted using petroleum ether, and vacuum drying was conducted to produce the compound of Formula 3-1 (5.2 g, yield 52 %). MS: $[M+H]^+= 1127$.

[0037] EXAMPLE 2: Preparation of the compound represented by Formula 3-2

[0038] 1) Synthesis of arylamine (4-(N-phenyl-N-phenylamino)phenyl-1-naphthylamine) to produce the compound represented by Formula 3-2: 15.0 g of 4-bromophenyl-N-phenyl-N-phenylamine (46.3 mmol) and 7.29 g of 1-naphthylamine (50.9 mmol) were dissolved in 200 ml of toluene, 13.34 g of sodium-tert-butoxide (138.8 mmol), 0.53 g of bis (dibenzylidene acetone)palladium(0) (0.93 mmol), and 0.56 ml of 50 wt% tri-tert-butylphosphine toluene solution (1.39 mmol) were added thereto, and reflux was conducted in a nitrogen atmosphere for 2 hours. Distilled water was added to the reaction solution to complete the reaction, and the organic layer was extracted. A column separation process was conducted using a solvent of n-hexane and tetrahydrofuran at a ratio of 10:1, stirring was conducted using petroleum ether, and vacuum drying was conducted to produce an arylamine connection group (13 g, yield 73 %). MS: $[M+H]^+= 386$.

[0039] 2) 4.68 g of compound of Formula b (8.88 mmol) and 7.88 g of 4-(N-phenyl-N-phenylamino)phenyl-1-naphthylamine (20.4 mmol) were dissolved in 120 ml of toluene, 5.89 g of sodium-tert-butoxide (61.3 mmol), 0.24 g of tris (dibenzylidene acetone)dipalladium(0) (0.41 mmol), and 0.25 ml of 50 wt% tri-tert-butylphosphine toluene solution (0.61 mmol) were added thereto, and reflux was conducted in a nitrogen atmosphere for 2 hours. Distilled water was added to the reaction solution to complete the reaction, and the organic layer was extracted. A column separation process was conducted using a solvent of n-hexane and tetrahydrofuran at a ratio of 4:1, stirring was conducted using petroleum ether, and vacuum drying was conducted to produce the compound of Formula 3-2 (5.4 g, yield 50 %). MS: $[M+H]^+= 1227$.

[0040] EXAMPLE 3: Preparation of the compound represented by Formula 3-4

[0041] 1) Synthesis of arylamine (4-(N-phenyl-N-phenylamino)phenyl-1-biphenylamine) to produce the compound represented by Formula 3-4: 17.4 g of 4-bromophenyl-N-phenyl-N-phenylamine (53.7 mmol) and 9.99 g of 4-aminobiphenyl (59.0 mmol) were dissolved in 250 ml of toluene, 17.02 g of sodium-tert-butoxide (177.1 mmol), 0.68 g of bis (dibenzylidene acetone)palladium(0) (1.2 mmol), and 0.72 ml of 50 wt% tri-tert-butylphosphine toluene solution (1.8 mmol) were added thereto, and reflux was conducted in a nitrogen atmosphere for 2 hours. Distilled water was added to the reaction solution to complete the reaction, and the organic layer was extracted. A column separation process was conducted using a solvent of n-hexane and tetrahydrofuran at a ratio of 10:1, stirring was conducted using petroleum ether, and vacuum drying was conducted to produce an arylamine connection group (16 g, yield 73 %). MS: $[M+H]^+= 412$.

[0042] 2) 4.68 g of compound of Formula b (8.88 mmol) and 8.42 g of 4-(N,N-diphenylamino)phenyl-4-biphenylamine (20.4 mmol) were dissolved in 120 ml of toluene, 5.89 g of sodium-tert-butoxide (61.3 mmol), 0.24 g of tris(dibenzylidene acetone)dipalladium(0) (0.41 mmol), and 0.25 ml of 50 wt% tri-tert-butylphosphine toluene solution (0.61 mmol) were added thereto, and reflux was conducted in a nitrogen atmosphere for 2 hours. Distilled water was added to the reaction solution to complete the reaction, and the organic layer was extracted. A column separation process was conducted using a solvent of n-hexane and tetrahydrofuran at a ratio of 4:1, stirring was conducted using petroleum ether, and vacuum drying was conducted to produce the compound of Formula 3-4 (5.2 g, yield 45.8 %). MS: $[M+H]^+= 1279$.

[0043] EXAMPLE 4: Preparation of the compound represented by Formula 3-21

[0044] Synthesis of arylamine (4-(N-phenyt-N-naphthylamino)phenyl-1-biphenylamine) to produce the compound represented by Formula 3-21: 14.0 g of 4-bromophenyl-N-phenyl-N-naphthylamine (37.4 mmol) and 6.96 g of 4-aminobiphenyl (41.2 mmol) were dissolved in 200 ml of toluene, 0.47 g of bis(dibenzylidene acetone)palladium(0) (0.82 mmol), 0.50 ml of 50 wt% tri-tert-butylphosphine toluene solution (1.2 mmol), and 11.86 g of sodium-tert-butoxide (123.4 mmol) were added thereto. After reflux was conducted in a nitrogen atmosphere for 2 hours, distilled water was added to the reaction solution to complete the reaction. The organic layer was extracted, and a column separation process was conducted using a developing solvent of n-hexane and tetrahydrofuran at a ratio of 10:1, stirring was conducted using petroleum ether, and vacuum drying was conducted to produce an arylamine connection group (7.5 g, yield 43 %). MS:

$[M+H]^+$= 462.

[0045] 2) 4.68 g of compound of Formula b (8.88 mmol) and 9.44 g of 4-(N-phenyl-l-naphthylamino)phenyl-4-biphenylamine (20.4 mmol) were dissolved in 120 ml of toluene, 5.89 g of sodium-tent-butoxide (61.3 mmol), 0.24 g of tris (dibenzylidene acetone)dipalladium(0) (0.41 mmol), and 0.25 ml of 50 wt% tittert-butylphosphine toluene solution (0.61 mmol) were added thereto, and reflux was conducted in a nitrogen atmosphere for 2 hours. Distilled water was added to the reaction solution to complete the reaction, and the organic layer was extracted. A column separation process was conducted using a solvent of n-hexane and tetrahydrofuran at a ratio of 4:1, stirring was conducted using petroleum ether, and vacuum drying was conducted to produce the compound of Formula 3-21 (5.5 g, yield 45 %). MS: $[M+H]^+$= 1379.

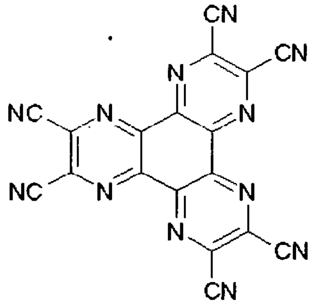
[0046] EXAMPLE 5: Production of an organic light emitting device

[0047] A glass substrate (corning 7059 glass), on which ITO (indium tin oxide) was applied to a thickness of 1000 Å to form a thin film, was put in distilled water, in which a detergent was dissolved, and washed using ultrasonic waves. In connection with this, a product manufactured by Fischer Inc. was used as the detergent, and distilled water was produced by filtering twice using a filter manufactured by Millipore Inc. After ITO was washed for 30 min, ultrasonic washing was conducted twice using distilled water for 10 min. After the washing using distilled water was completed, ultrasonic washing was conducted using isopropyl alcohol, acetone, and methanol solvents, and drying was then conducted. Next, it was transported to a plasma washing machine. The substrate was dry washed using oxygen plasma for 5 min, and then transported to a vacuum evaporator.

[0048] Hexanitrile hexaazatriphenylene (hereinafter, referred to as "HAT") of the following Formula was vacuum deposited to a thickness of 80 Å by heating on a transparent ITO electrode, which was prepared through the above procedure, so as to form an anode including an ITO conductive layer and an N-type organic material.

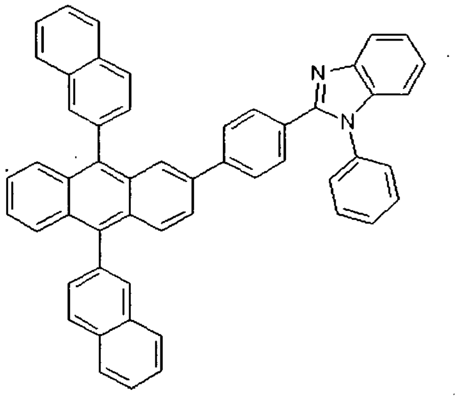
[0049]

[HAT]



[0050] Interfacial characteristics between the substrate and a hole injection layer can be improved using the thin film. Subsequently, the compound of Formula 3-1 was deposited to a thickness of 800 Å on the thin film to form the hole injection layer. NPB was deposited thereon to a thickness of 300 Å so as to form a hole transport layer, and Alq3 was deposited thereon to a thickness of 300 Å to form the light emitting layer. An electron transport layer material of the following Formula was deposited to a thickness of 200 Å on the light emitting layer to form an electron transport layer.

[0051]



Electron transport layer material

[0052] Lithium fluoride (LiF) having a thickness of 12 Å and aluminum having a thickness of 2000 Å were sequentially deposited on the electron transport layer to form a cathode.

[0053] In the above procedure, the deposition speed of an organic material was maintained at 0.3 - 0.8 Å/sec. Furthermore, lithium fluoride and aluminum were deposited at speeds of 0.3 Å/sec and 1.5 - 2.5 Å/sec, respectively, on the cathode. During the deposition, a vacuum was maintained at 1 - 3 X 10^{-7}.

[0054] The resulting device had an electric field of 4.76 V at a forward current density of 100 mA/cm^2, and a spectrum having a light efficiency of 1.93 Im/W. The operation and light emission of the device at the above-mentioned actuating voltage mean that the compound of Formula 3-1, which formed the layer between the thin film on the substrate and the hole transport layer, functions to inject holes.

[0055] EXAMPLE 6: Production of an organic light emitting device

[0056] The procedure of example 5 was repeated to produce a device except that the compound of Formula 3-1 used as a hole injection layer was substituted with the compound of Formula 3-2.

[0057] The resulting device had an electric field of 4.72 V at a forward current density of 100 mA/cm^2, and a spectrum having a light efficiency of 1.94 lm/W. The operation and light emission of the device at the above-mentioned actuating voltage mean that the compound of Formula 3-2, which formed a layer between a thin film on a substrate and a hole transport layer, functions to inject holes.

[0058] EXAMPLE 7: Production of an organic light emitting device

[0059] The procedure of example 5 was repeated to produce a device except that the compound of Formula 3-1 used as a hole injection layer was substituted with the compound of Formula 3-4.

[0060] The resulting device had an electric field of 4.65 V at a forward current density of 100 mA/cm^2, and a spectrum having a light efficiency of 1.92 Im/W. The operation and light emission of the device at the above-mentioned actuating voltage mean that the compound of Formula 3-4, which formed a layer between a thin film on a substrate and a hole transport layer, functions to inject holes.

[0061] EXAMPLE 8: Production of an organic light emitting device

[0062] The procedure of example 5 was repeated to produce a device except that the compound of Formula 3-1 used as a hole injection layer was substituted with the compound of Formula 3-21.

[0063] The resulting device had an electric field of 4.60 V at a forward current density of 100 mA/cm^2, and a spectrum having a light efficiency of 1.97 lm/W. The operation and light emission of the device at the above-mentioned actuating voltage mean that the compound of Formula 3-21, which formed a layer between a thin film on a substrate and a hole transport layer, functions to inject holes.

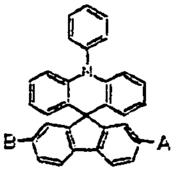
Industrial Applicability'

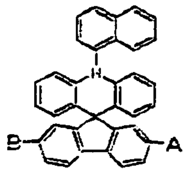
[0064] The compound of the present invention can be used as an organic material layer material, particularly, hole injection and/or transport materials in an organic light emitting device, and when applied to an organic light emitting device it is possible to reduce the actuating voltage of the device, to improve the light efficiency thereof, and to improve the lifespan of the device through the thermal stability of the compound.

Claims

1. An organic light-emitting device comprising:

   a first electrode;
   organic material layers comprising a light-emitting layer and one of a hole-injection layer, a hole-transport layer and a layer which both injects and transports holes; and
   a second electrode;
   wherein the first electrode, the organic material layers and the second electrode form a layered structure; and the hole-injection layer, the hole-transport layer or the layer which both injects and transports holes comprises a compound represented by one of the following formulae:





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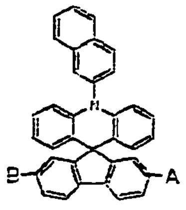
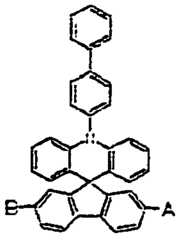
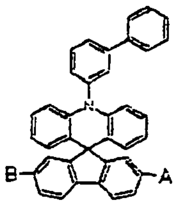
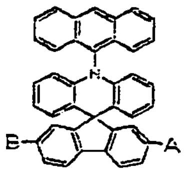
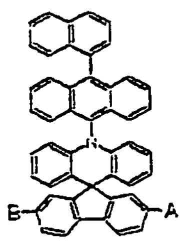
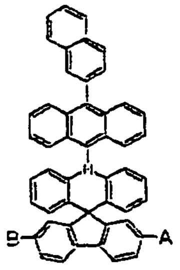


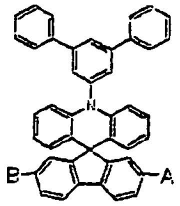


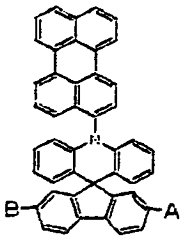


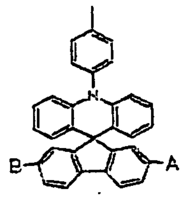


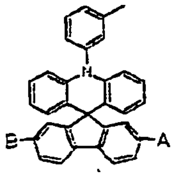


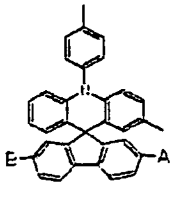


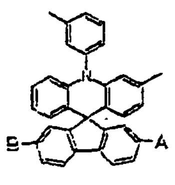


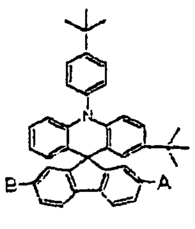


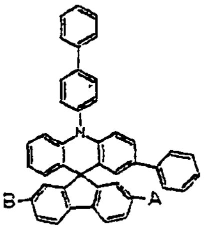




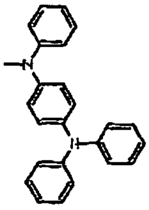








   wherein A and B each independently represents one of the following groups: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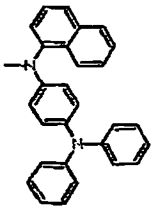
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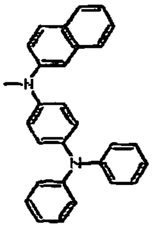
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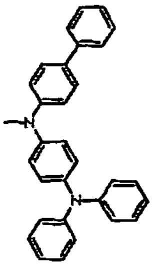
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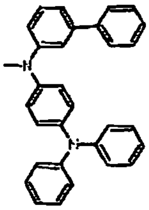
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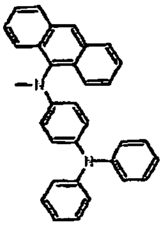
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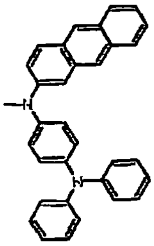
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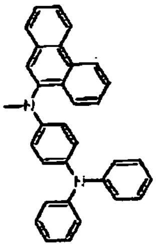
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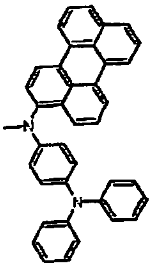
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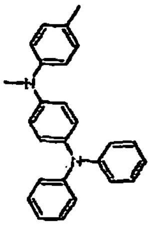
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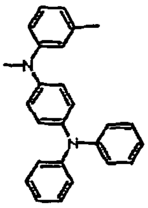
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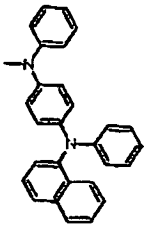
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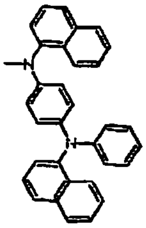
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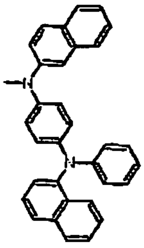
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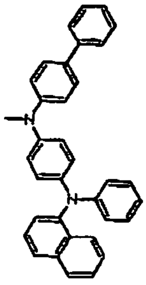
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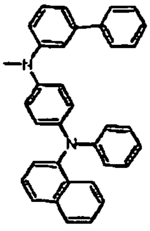
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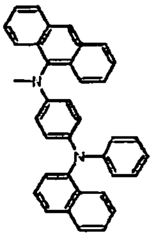
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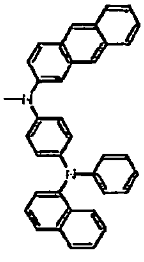
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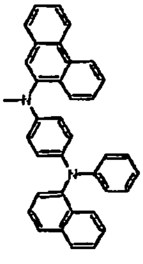
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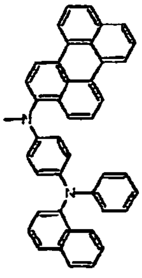
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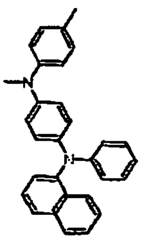
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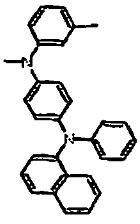
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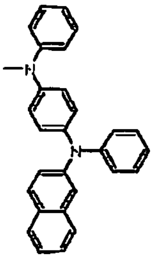
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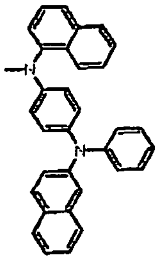
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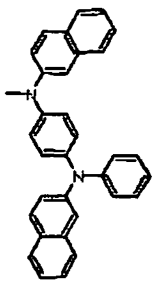
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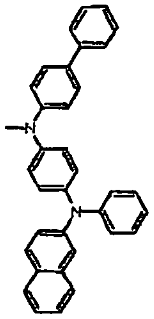
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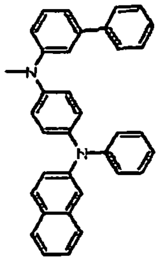
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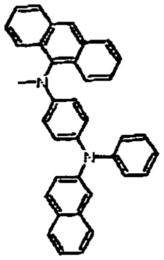
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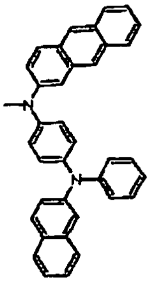
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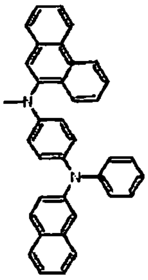
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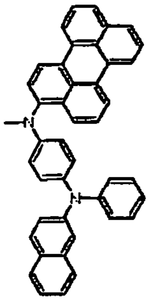
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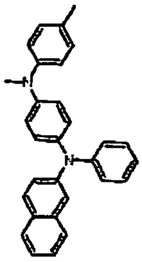
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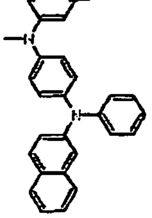
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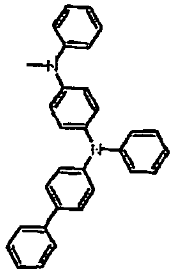
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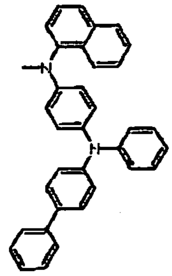
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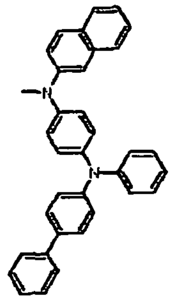
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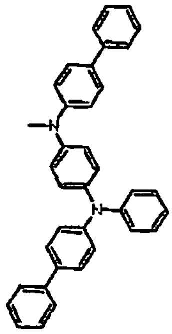
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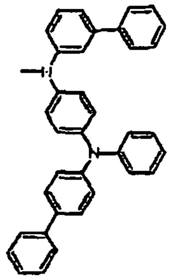
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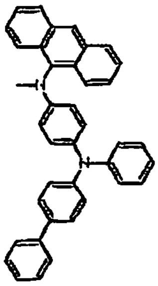
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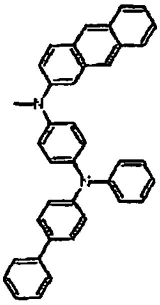
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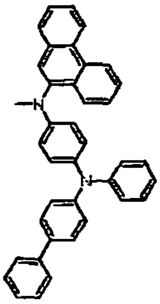
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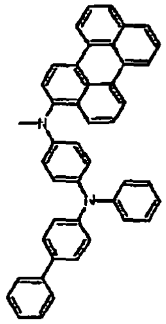
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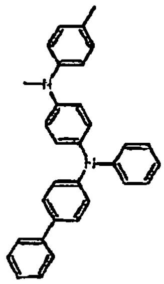
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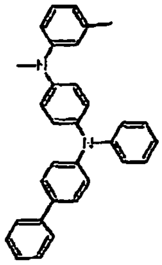
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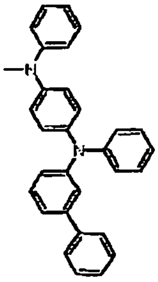
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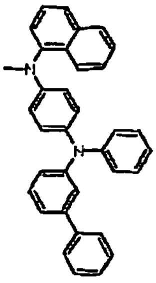
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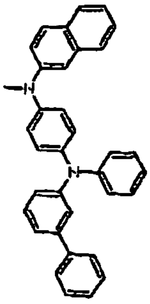
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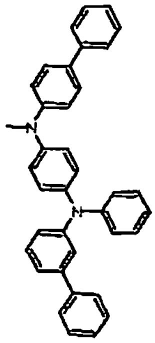
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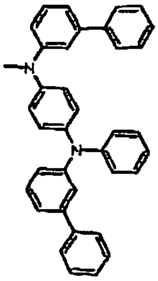
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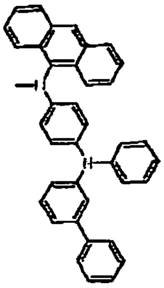
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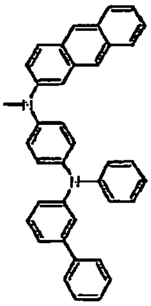
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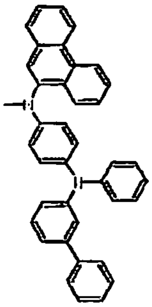
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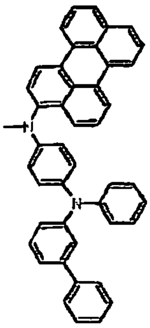
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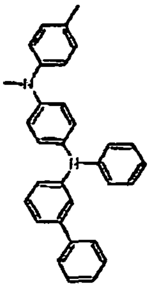
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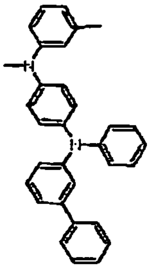
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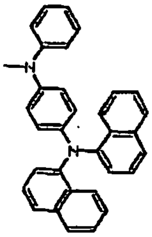
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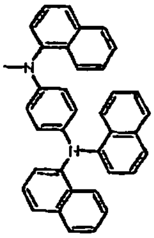
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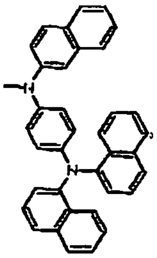
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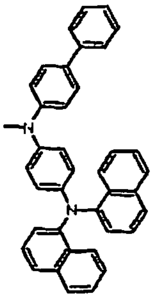
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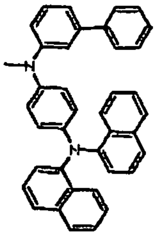
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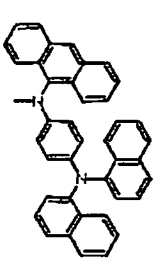
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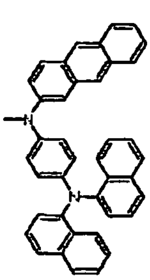
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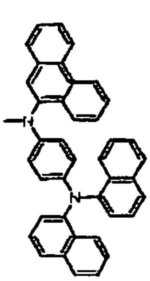
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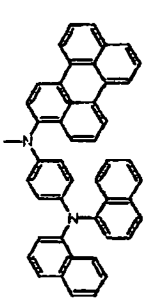
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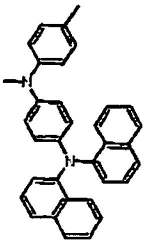
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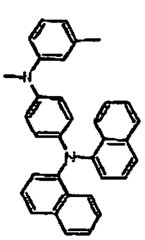
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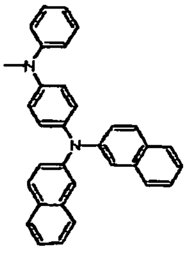
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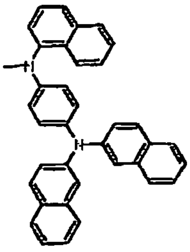
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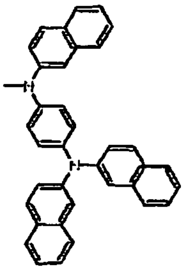
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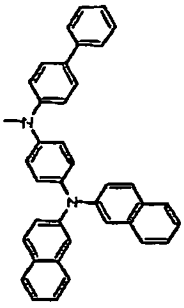
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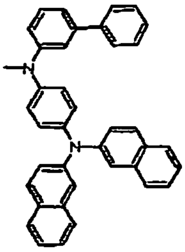
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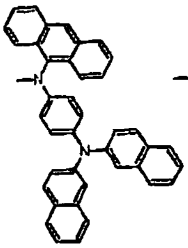
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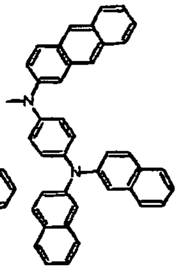
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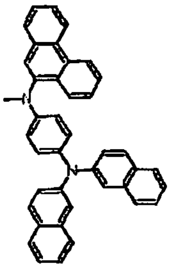
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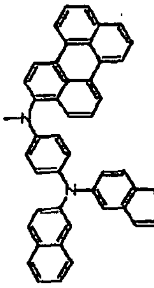
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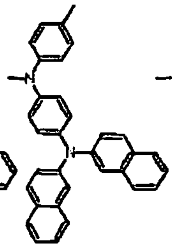
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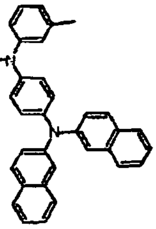
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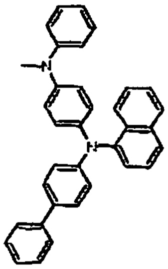
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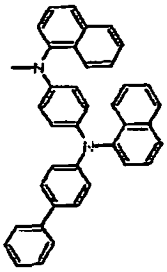
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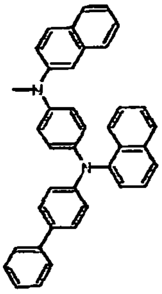
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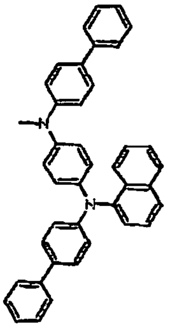
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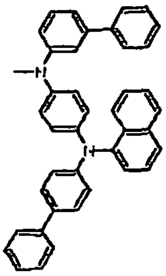
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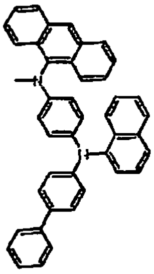
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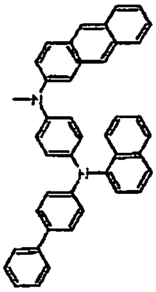
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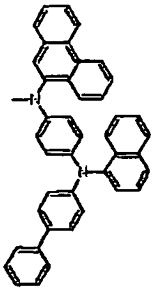
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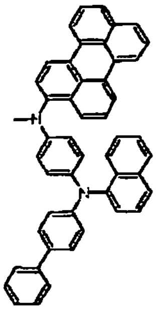
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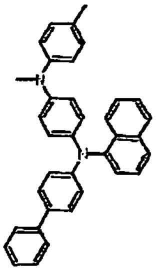
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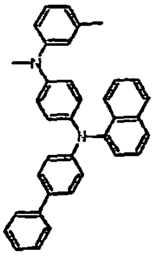
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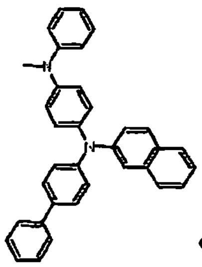
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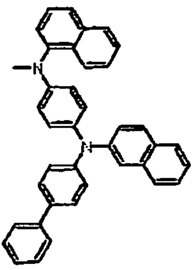
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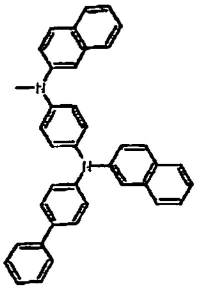
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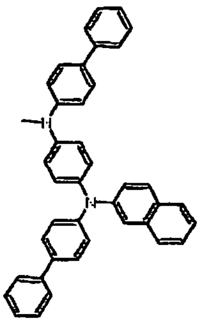
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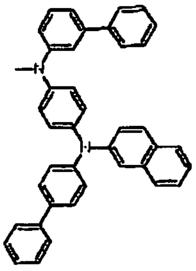
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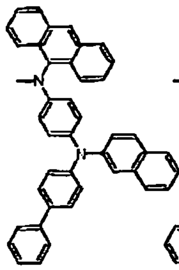
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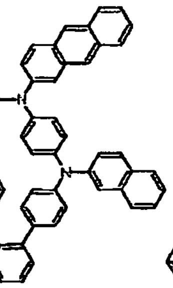
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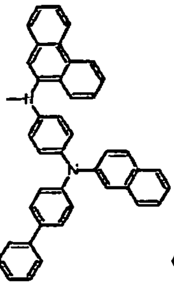
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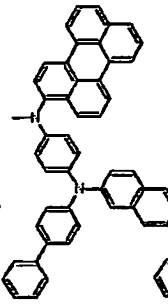
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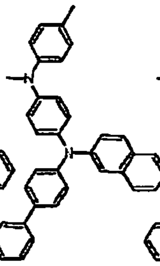
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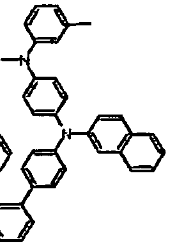
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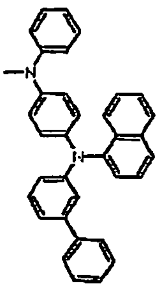
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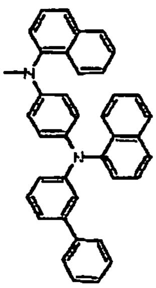
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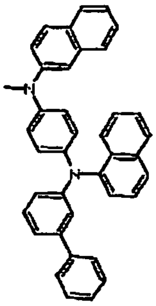
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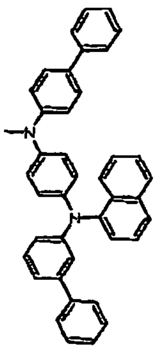
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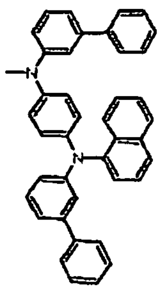
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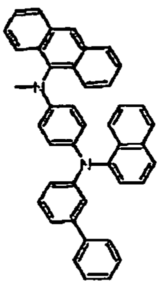
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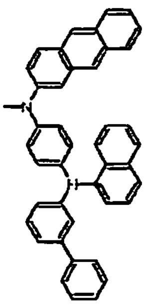
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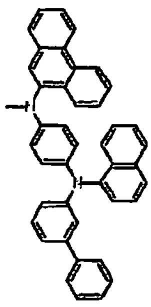
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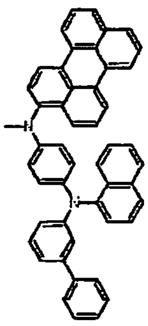
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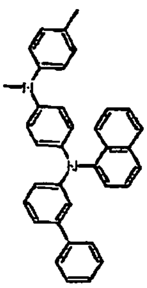
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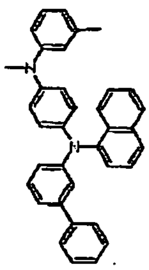
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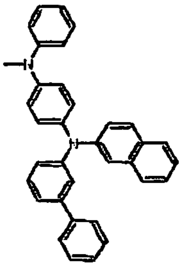
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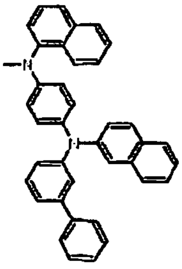
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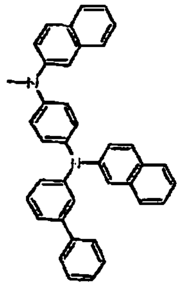
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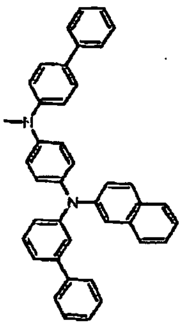
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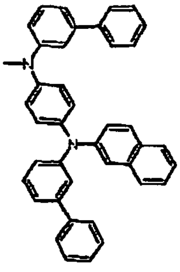
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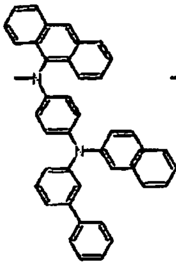
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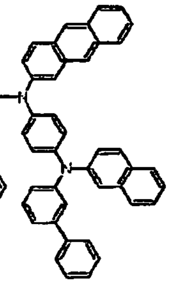
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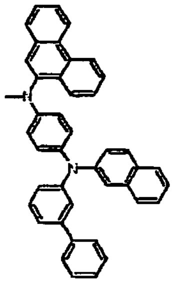
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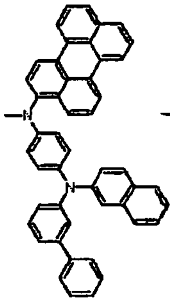
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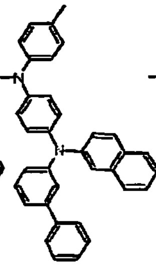
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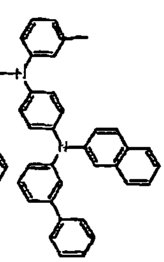
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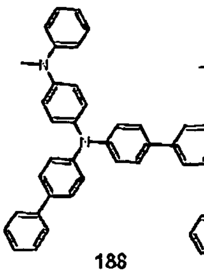
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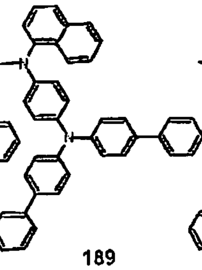
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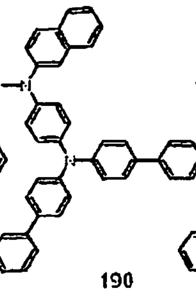
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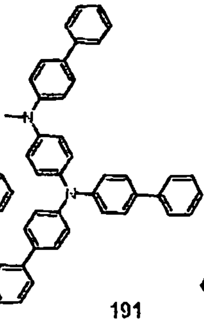
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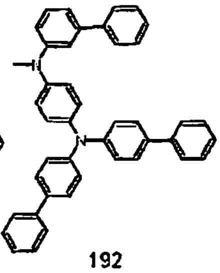
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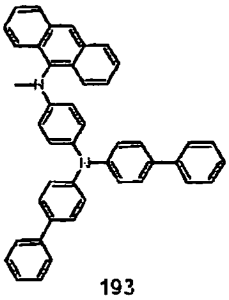
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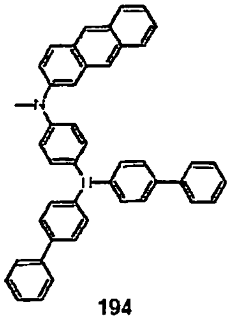
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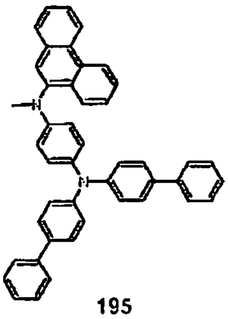
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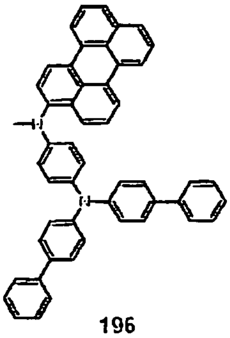
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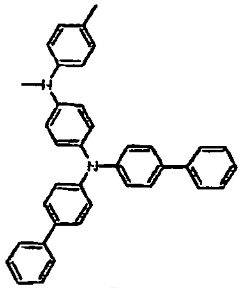

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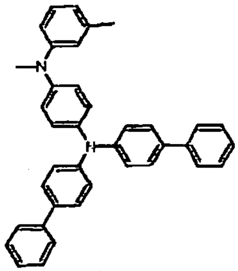

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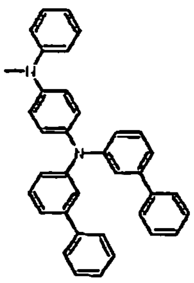

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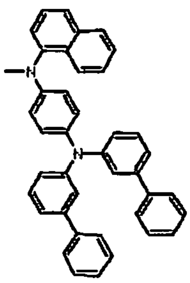

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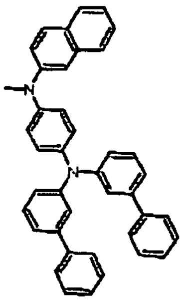

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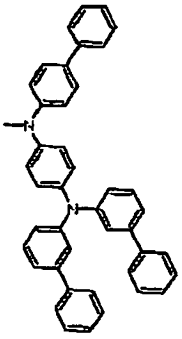

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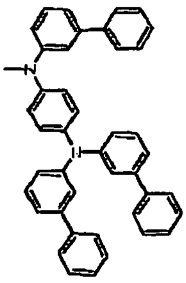

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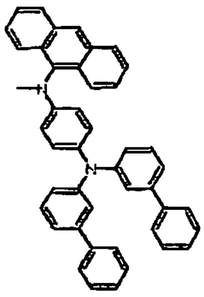

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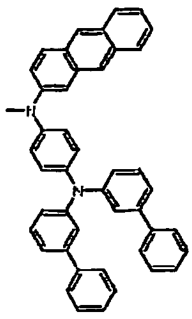

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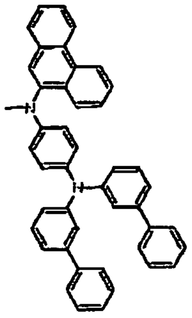

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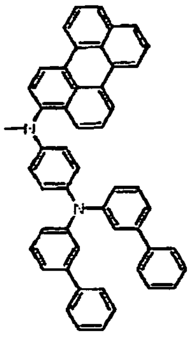

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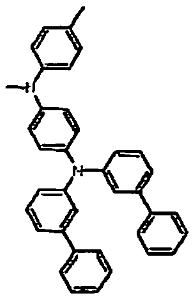

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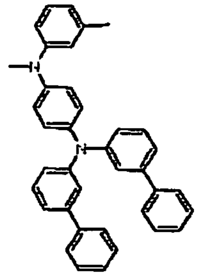

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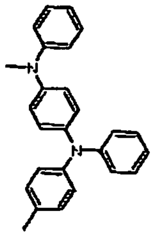
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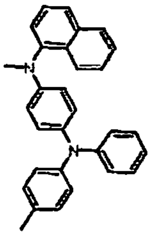
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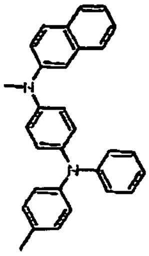
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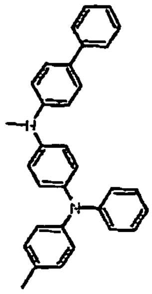
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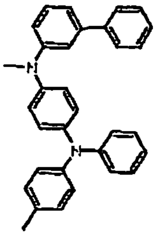
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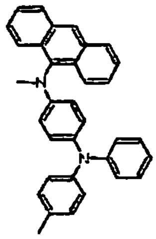
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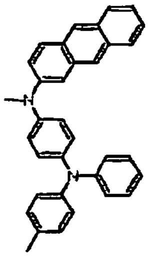
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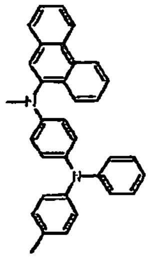
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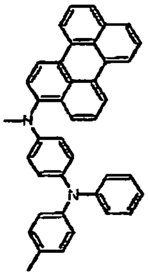
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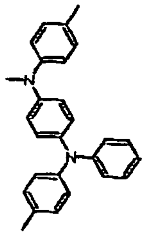
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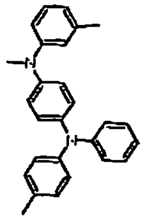
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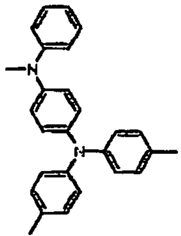
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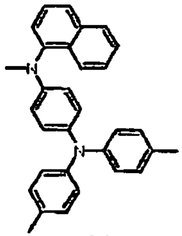
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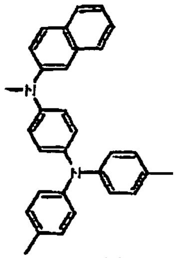
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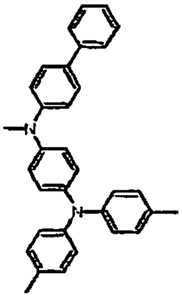
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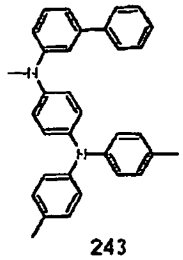
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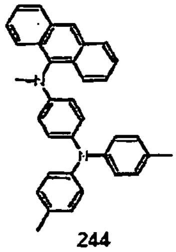
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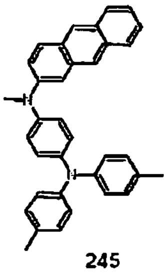
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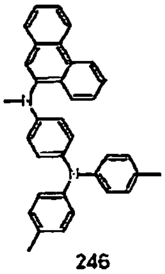
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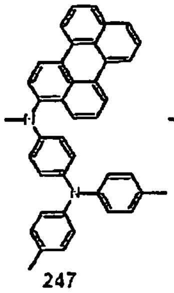
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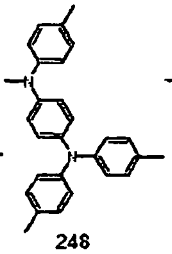
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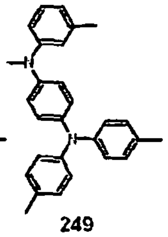
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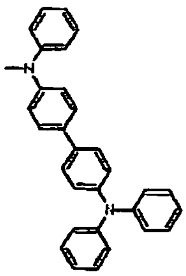

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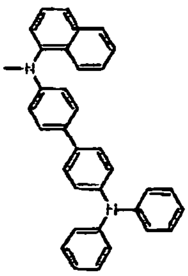

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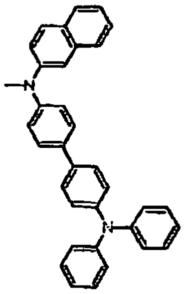

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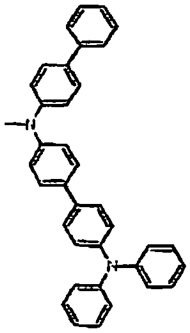

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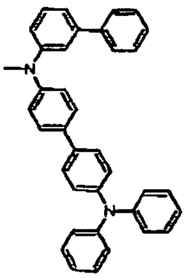

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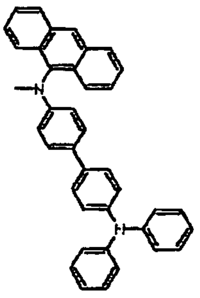

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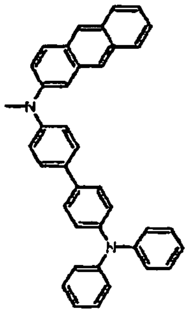

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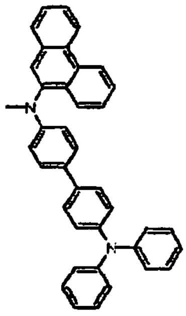

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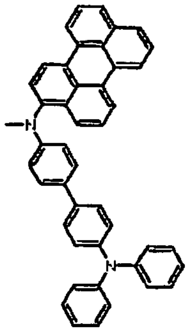

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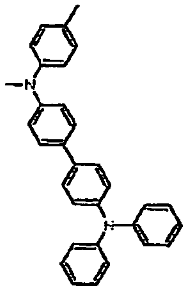

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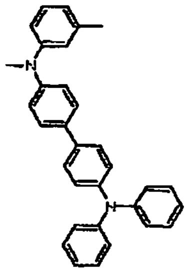

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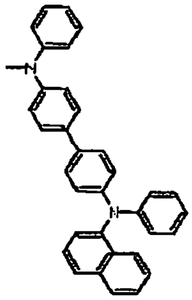

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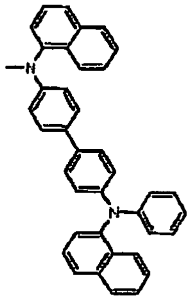

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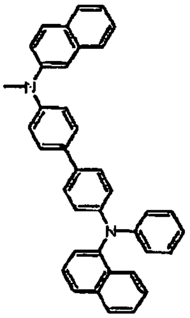

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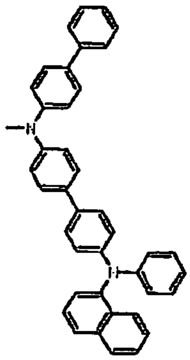

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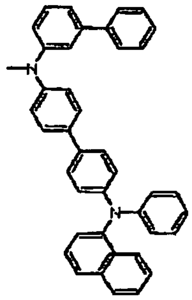

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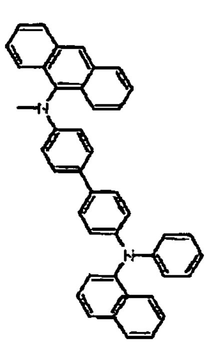
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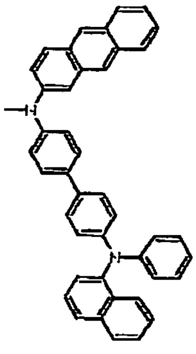
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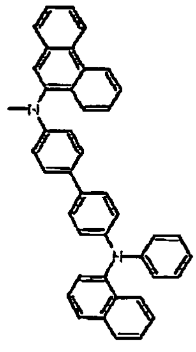
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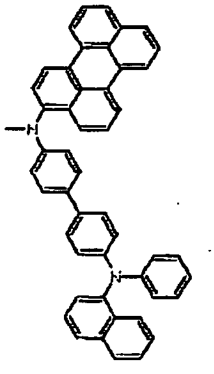
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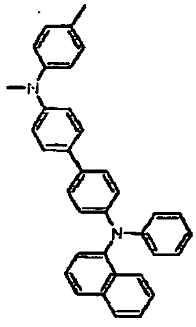
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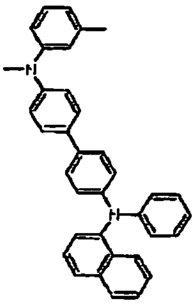
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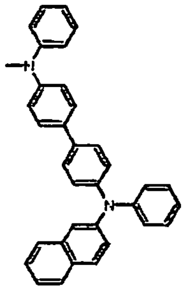
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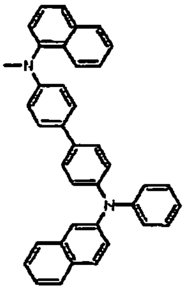
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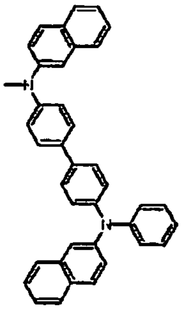
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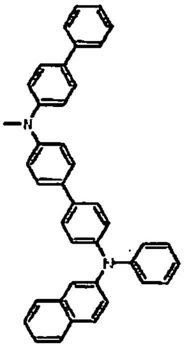
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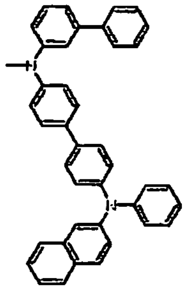
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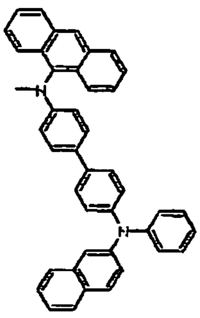
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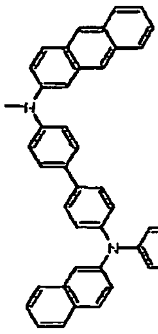
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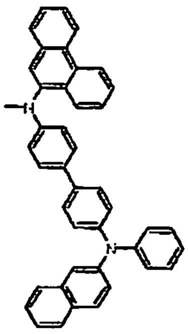
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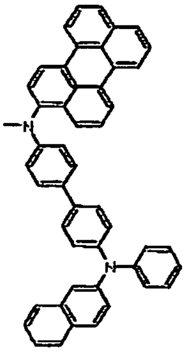
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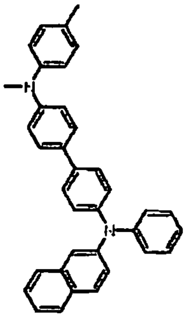
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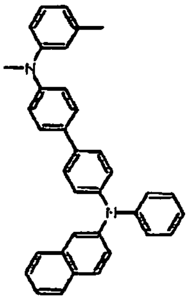
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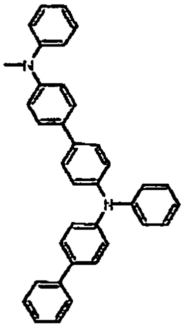
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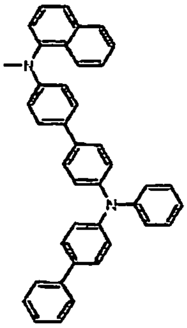
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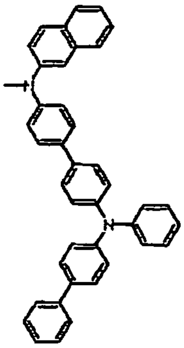
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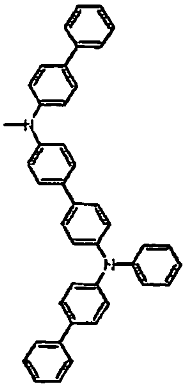
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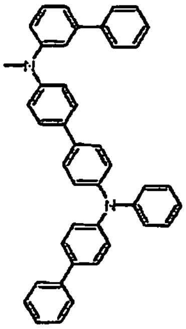
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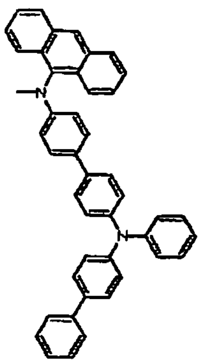

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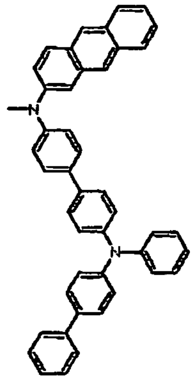

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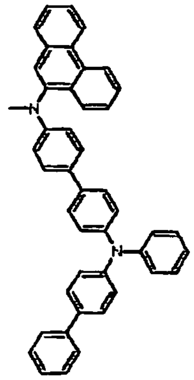

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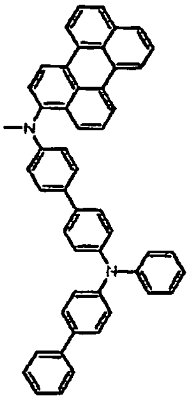

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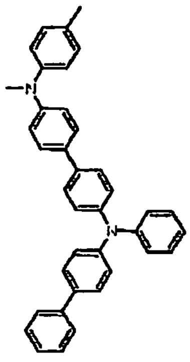

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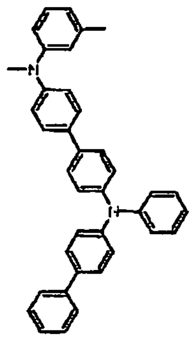

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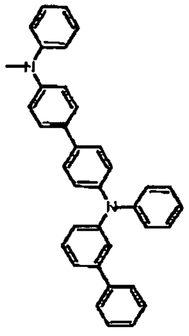

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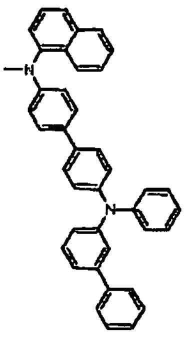

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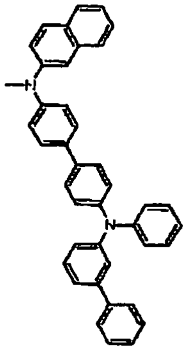

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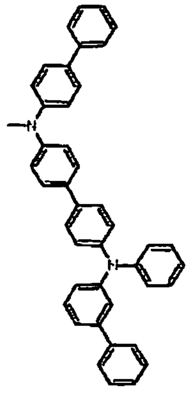

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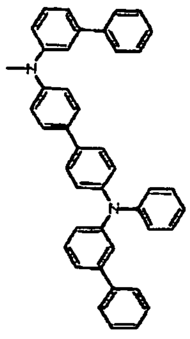

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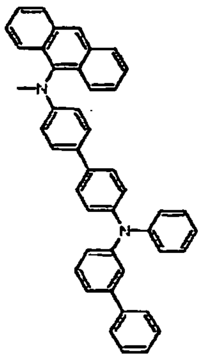

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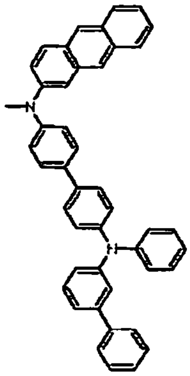

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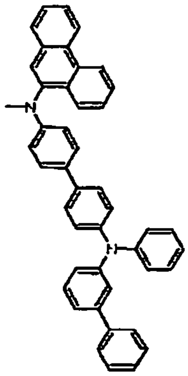

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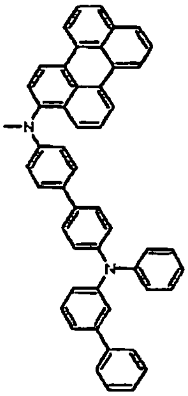

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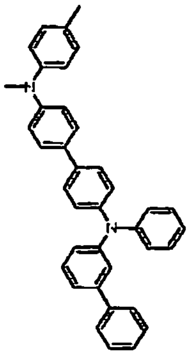

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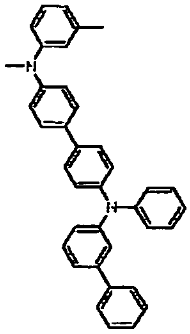

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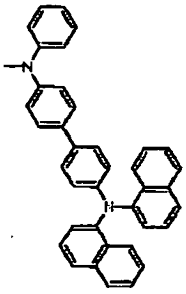

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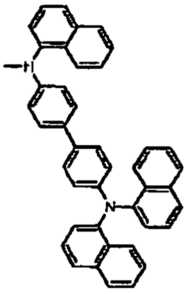

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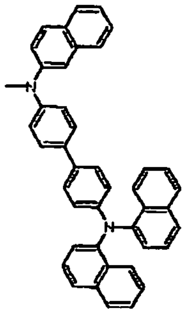

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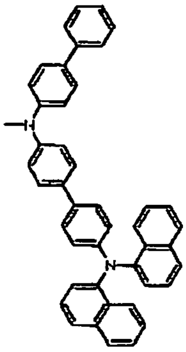

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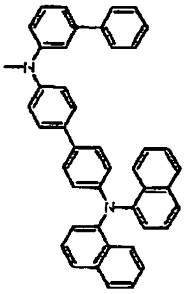

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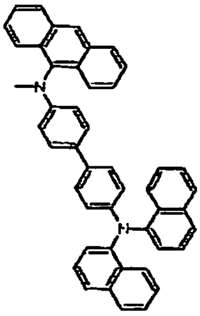
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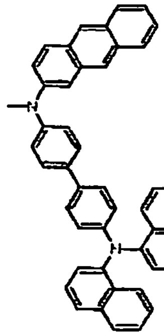
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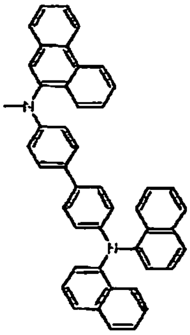
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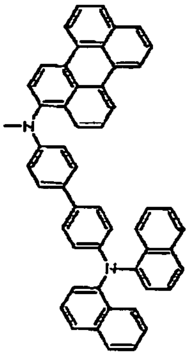
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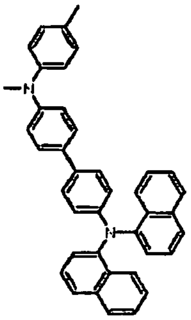
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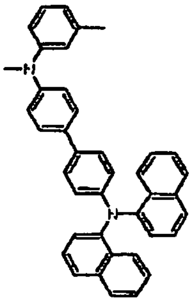
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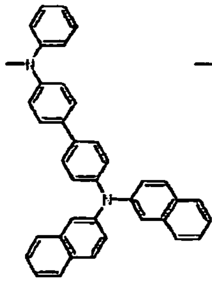
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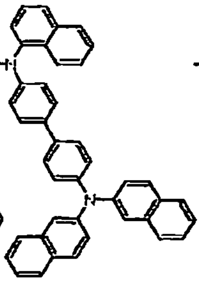
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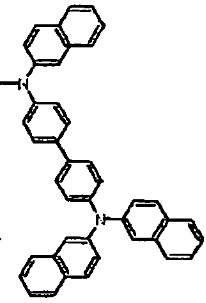
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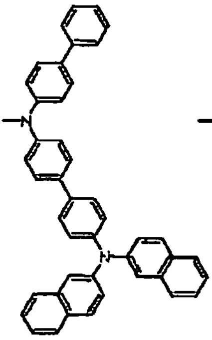
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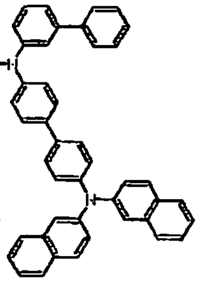
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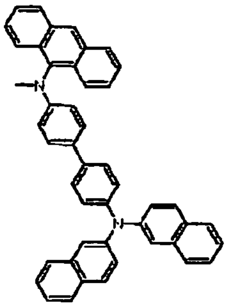
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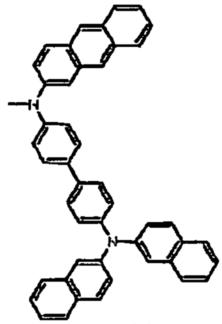
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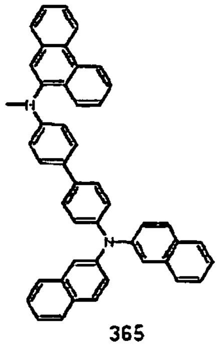
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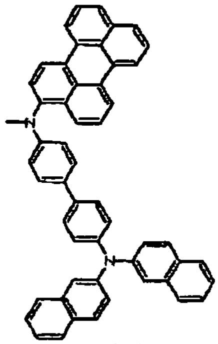
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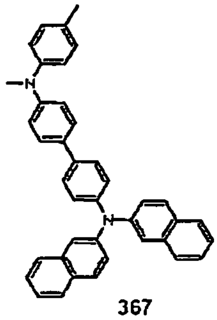
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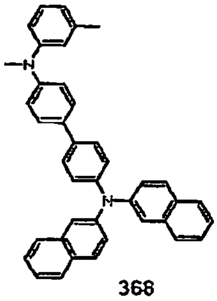
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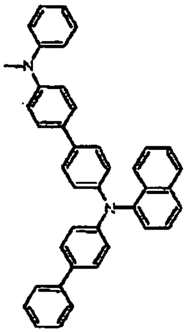
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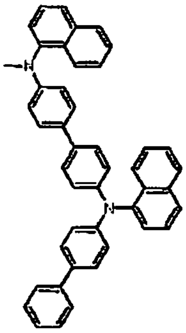
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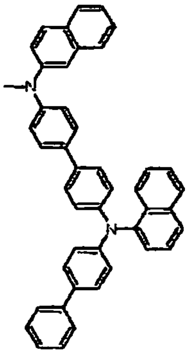
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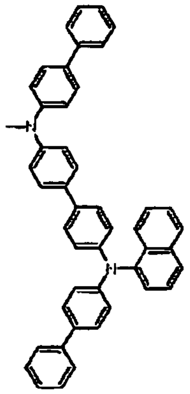
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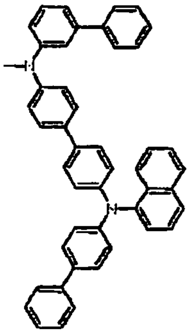
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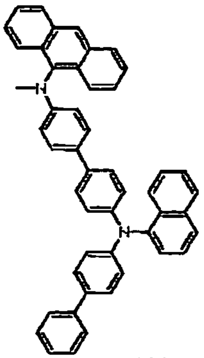

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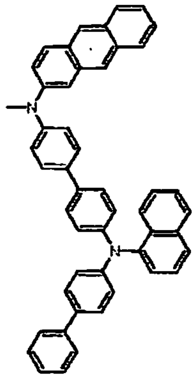

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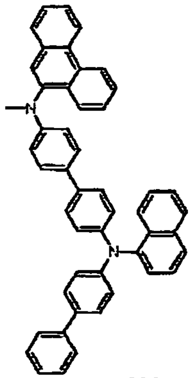

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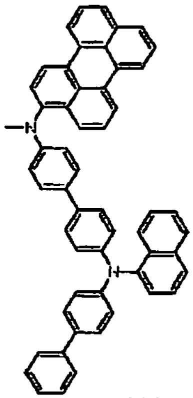

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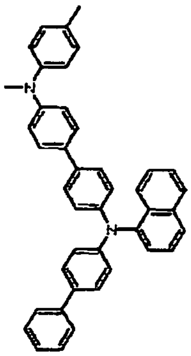

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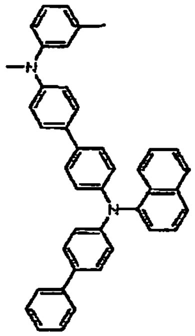

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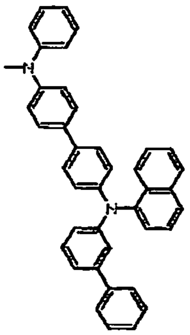

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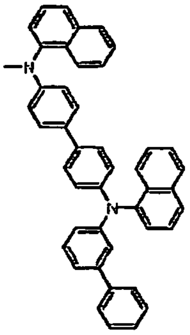

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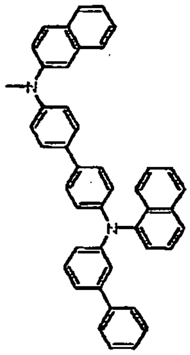

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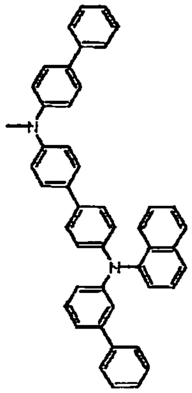

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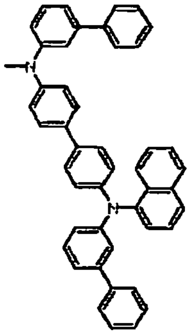

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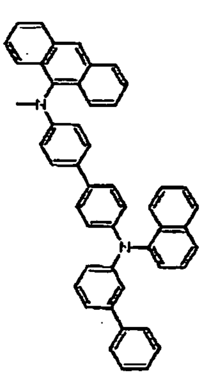
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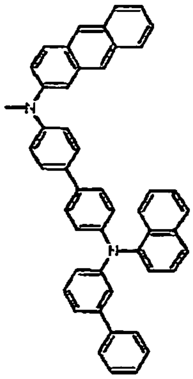
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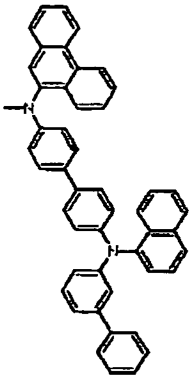
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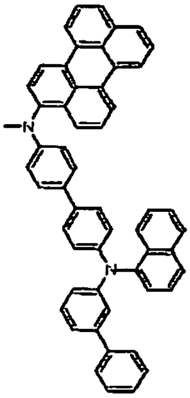
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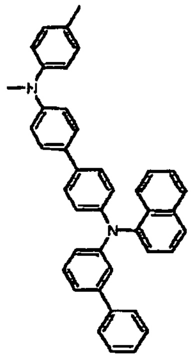
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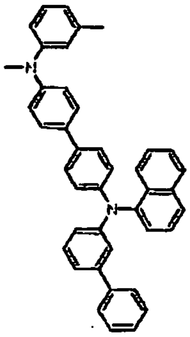
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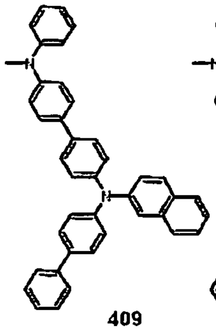
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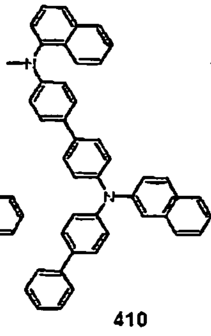
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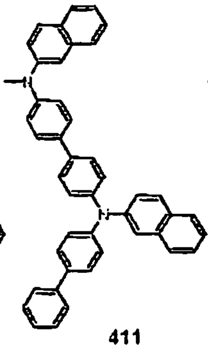
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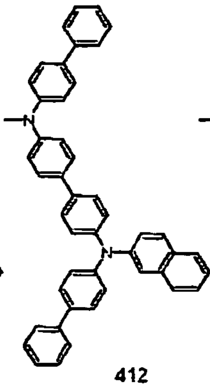
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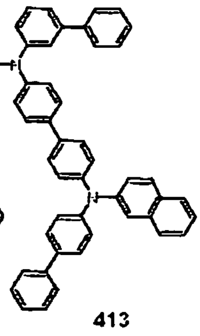
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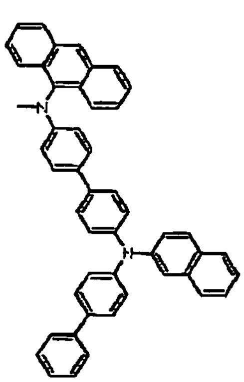

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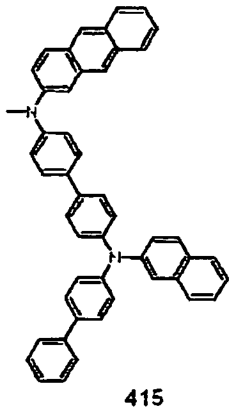

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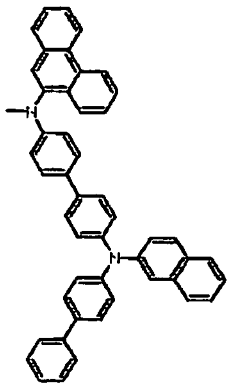

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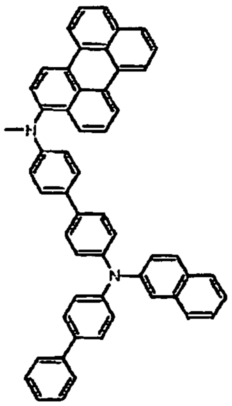

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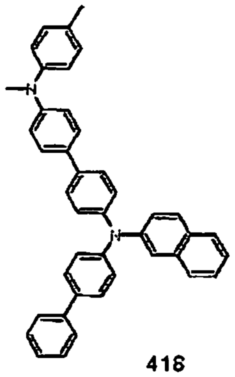

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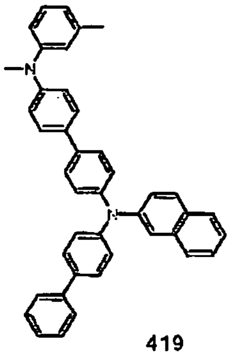

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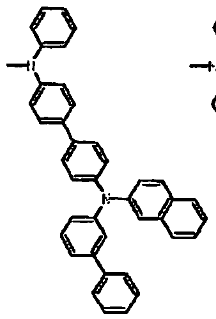

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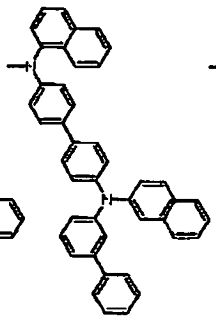

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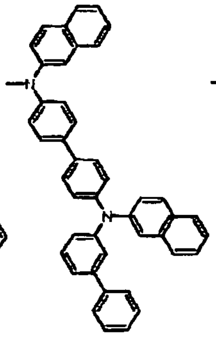

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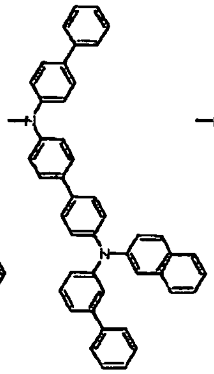

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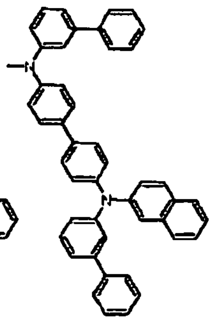

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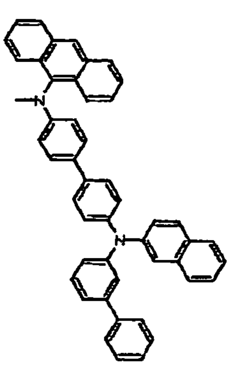

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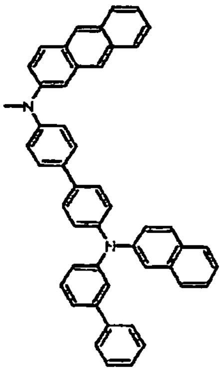

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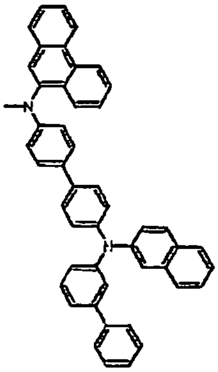

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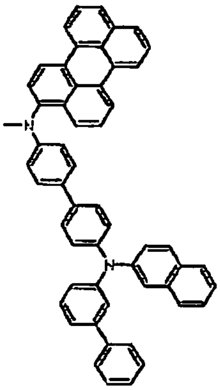

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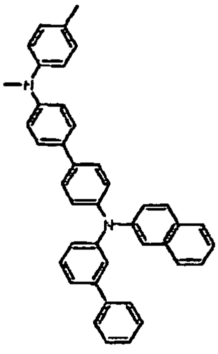

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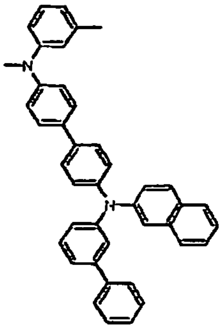

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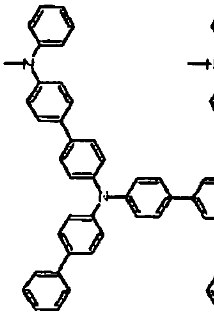

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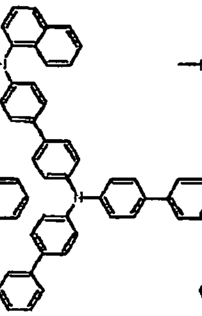

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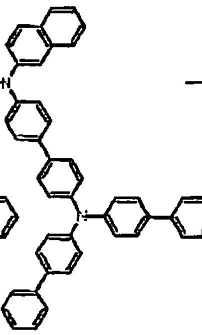

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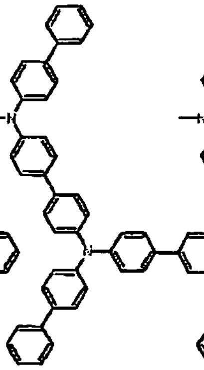

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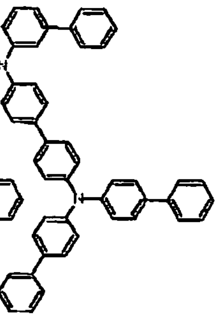

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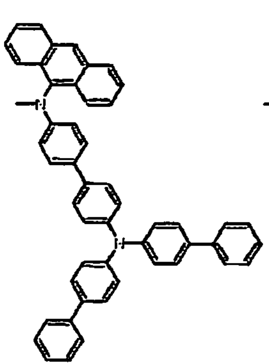
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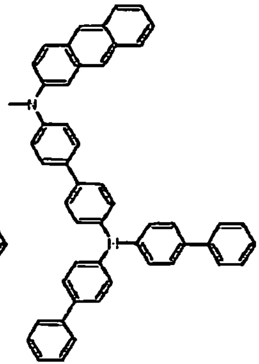
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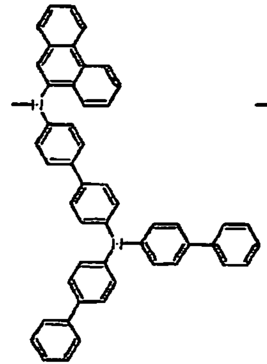
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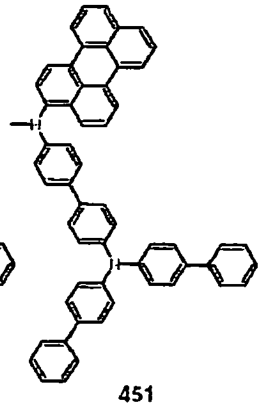
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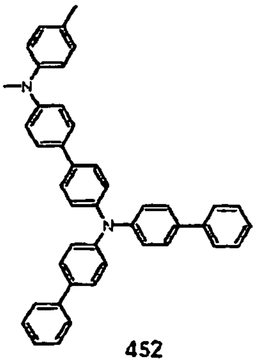
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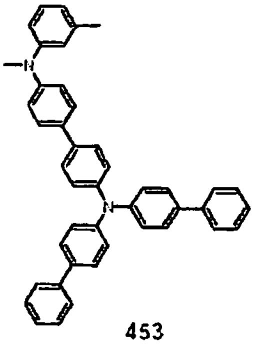
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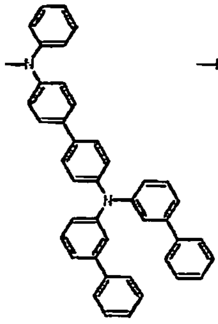
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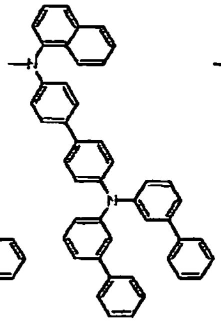
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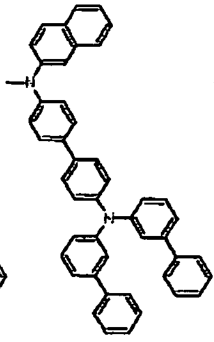
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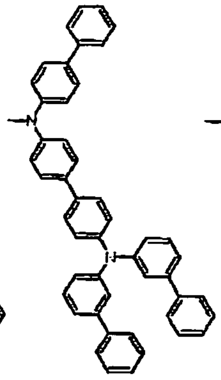
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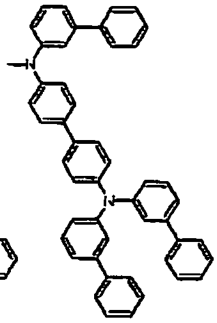
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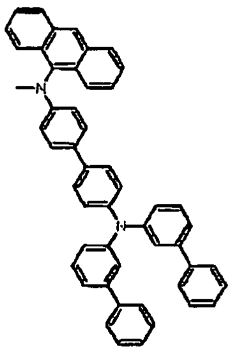

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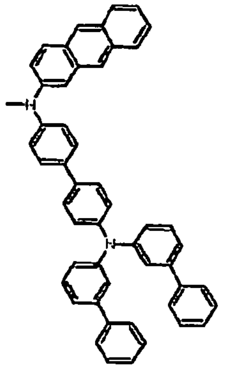

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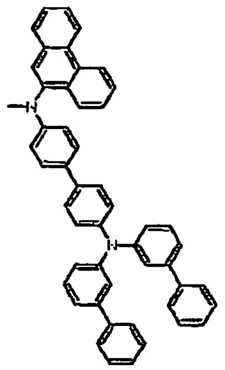

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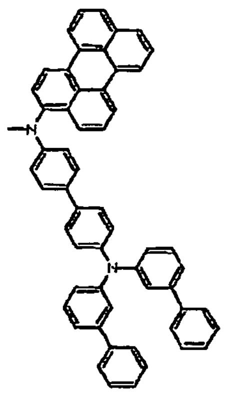

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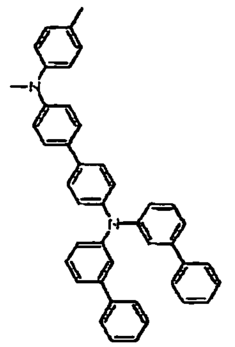

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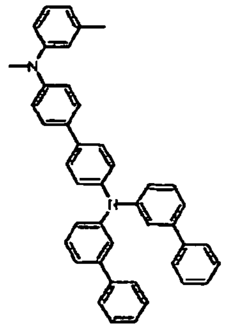
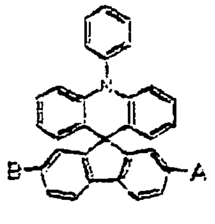


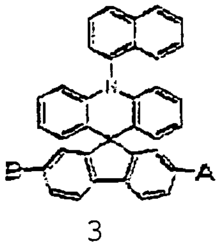
470

Patentansprüche

1. Organische lichtemittierende Vorrichtung, umfassend:

   eine erste Elektrode;
   organische Materialschichten, die eine lichtemittierende Schicht und eine aus einer Lochinjektionsschicht, einer Lochtransportschicht und einer Schicht, die Löcher sowohl injiziert als auch transportiert, umfasst; une
   eine zweite Elektrode;
   wobei die erste Elektrode, die organischen Materialschichten und die zweite Elektrode eine Schichtstruktur bilden; und
   die Lochinjektionsschicht, die Lochtransportschicht oder die Schicht, die Löcher sowohl injiziert als auch transportiert, eine Verbindung umfassen, die durch eine der nachstehenden Formeln dargestellt ist:





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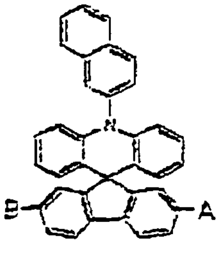
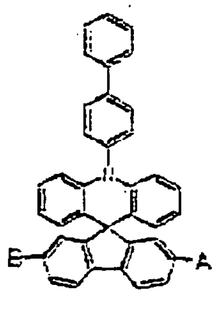
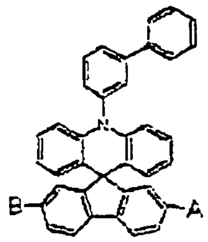
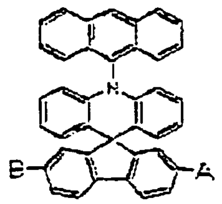
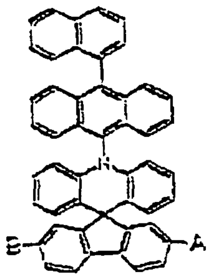
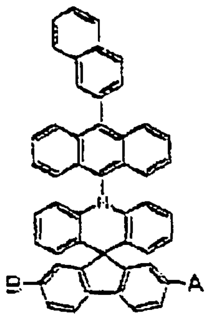


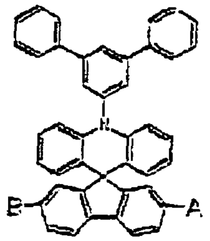


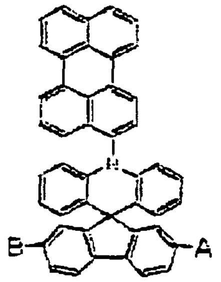


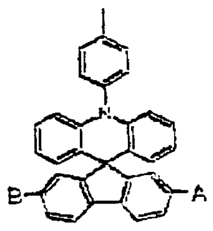


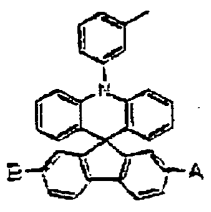


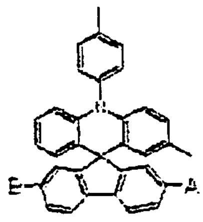


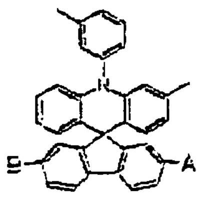


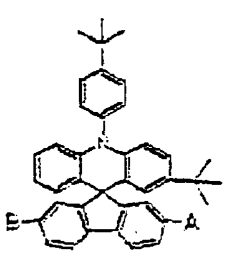


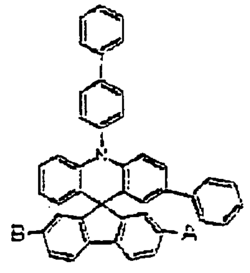




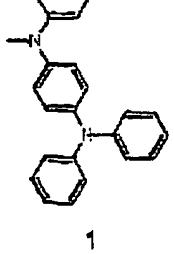








worin A und B jeweils unabhängig voneinander die nachstehenden Gruppen darstellen:



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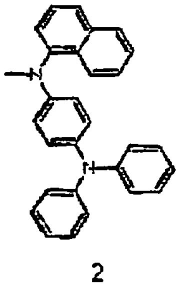

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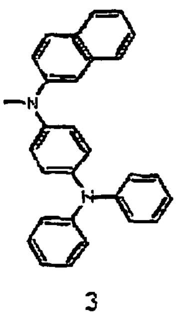

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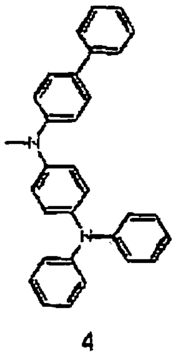

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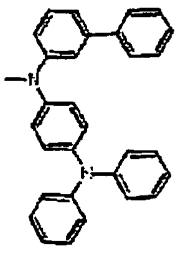

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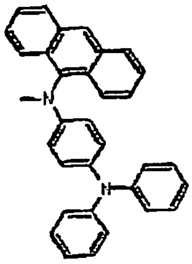

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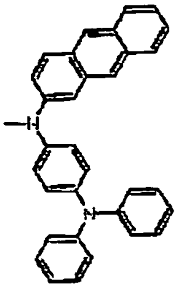

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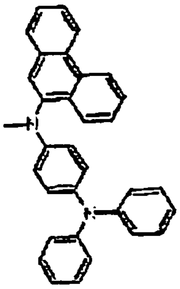

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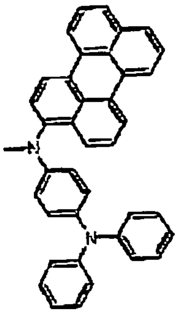

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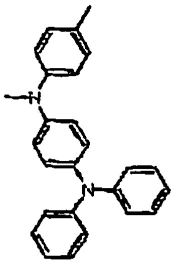

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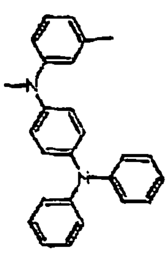

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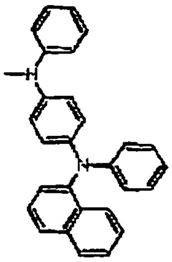

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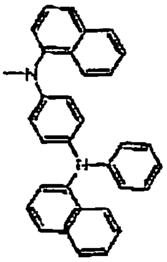

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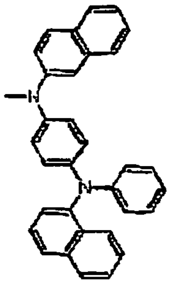

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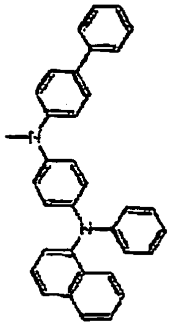

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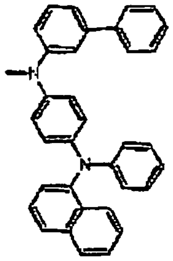

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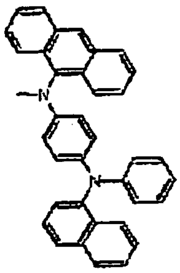

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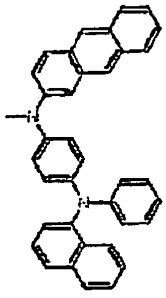

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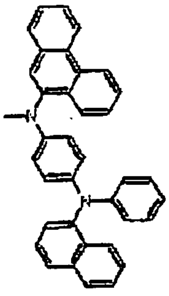

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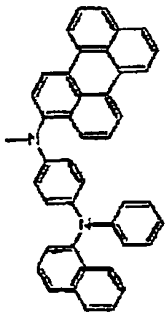

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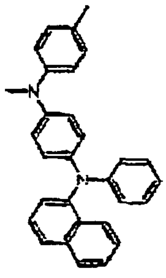

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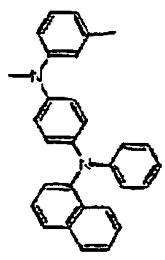

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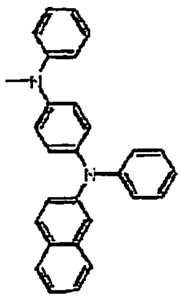

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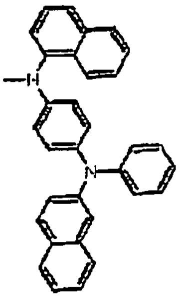

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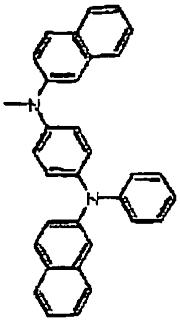

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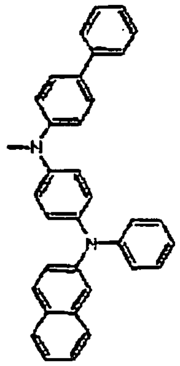

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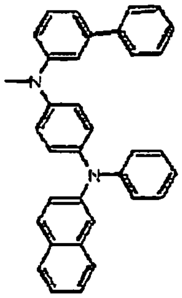

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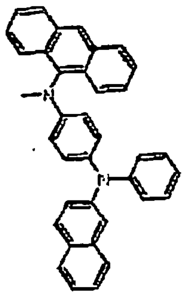

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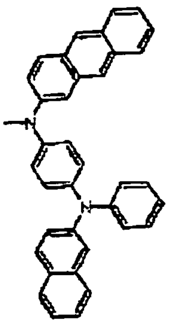

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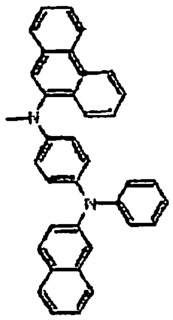

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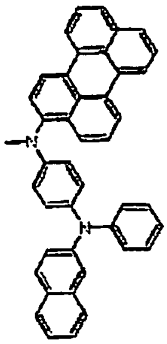

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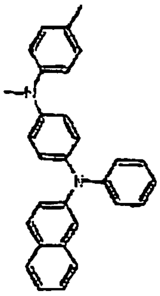

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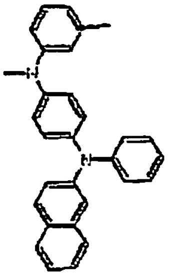

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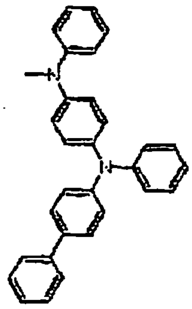

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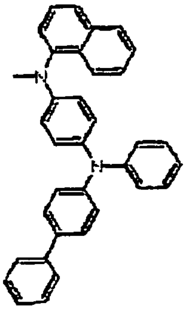

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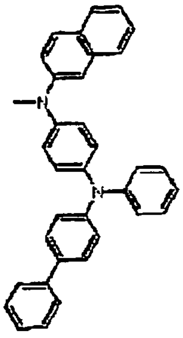

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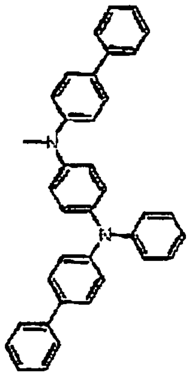

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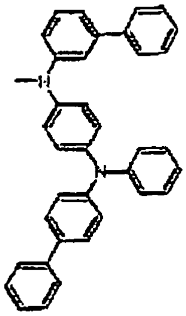

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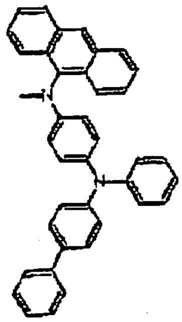

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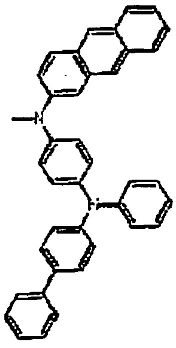

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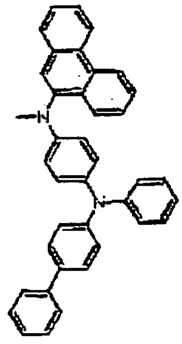

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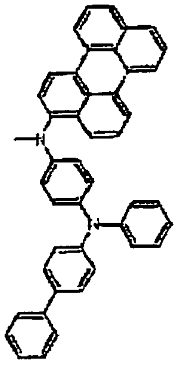

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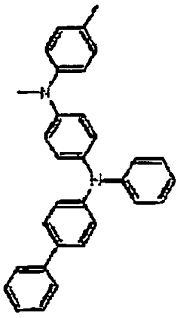

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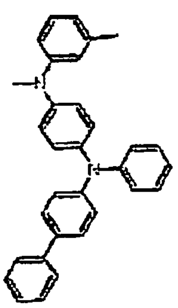

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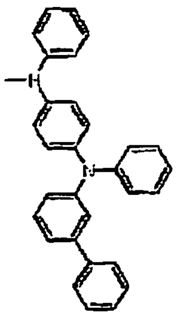

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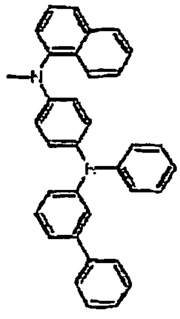

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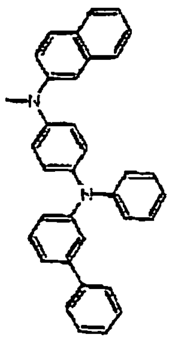

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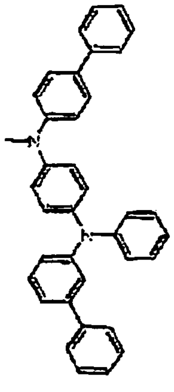

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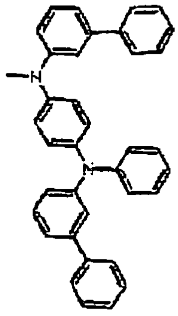

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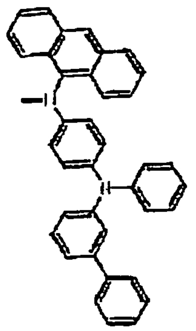

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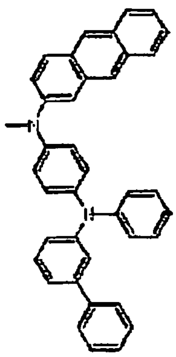

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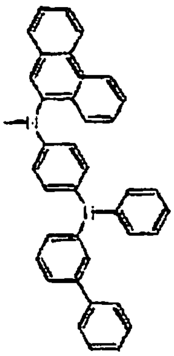

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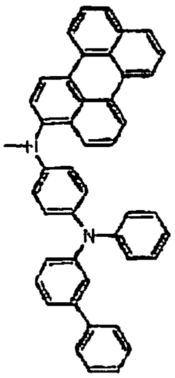

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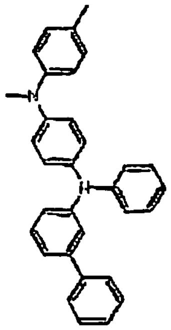

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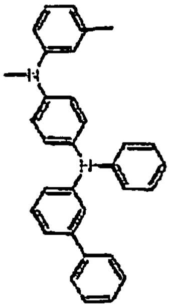

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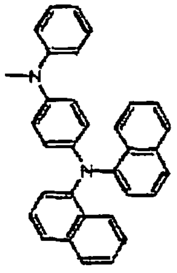
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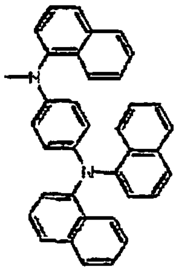
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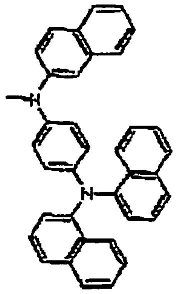
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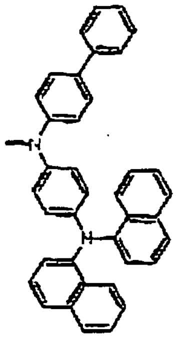
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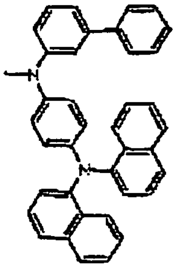
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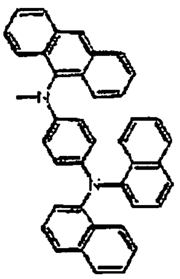
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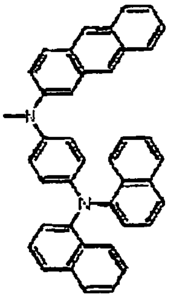
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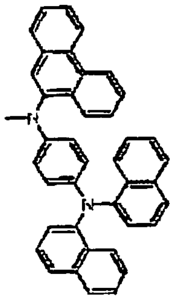
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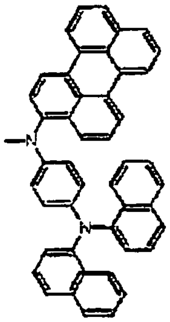
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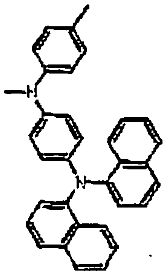
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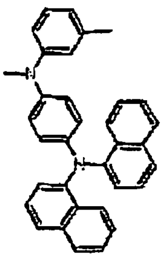
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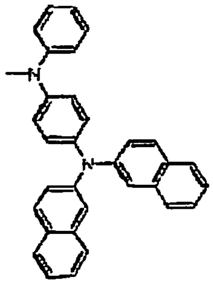
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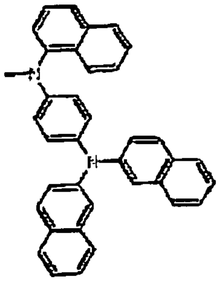
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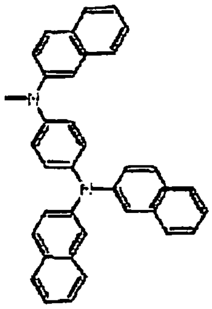
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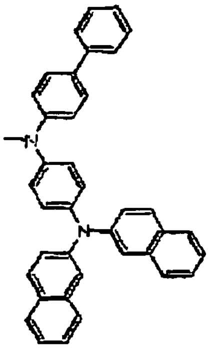
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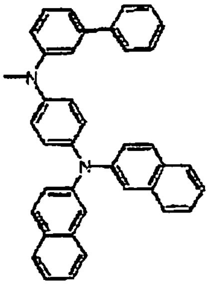
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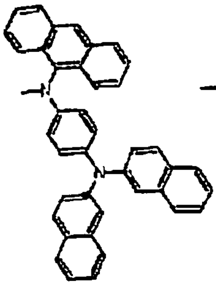

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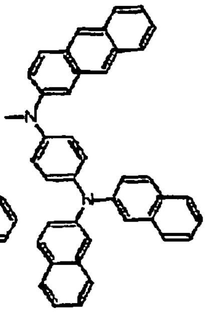

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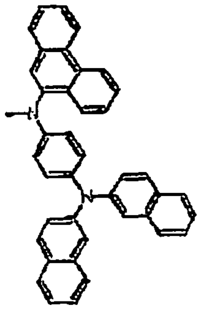

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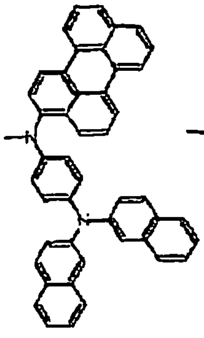

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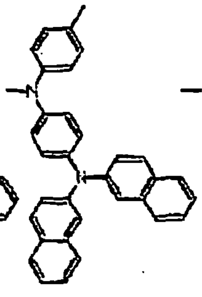

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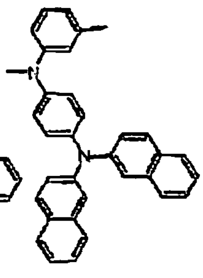

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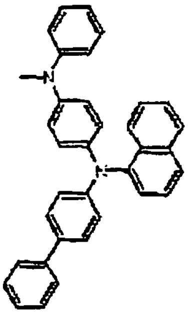

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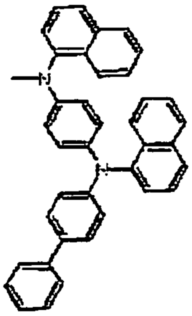

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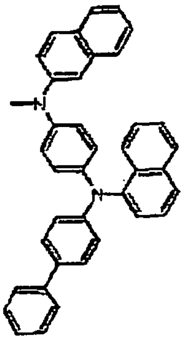

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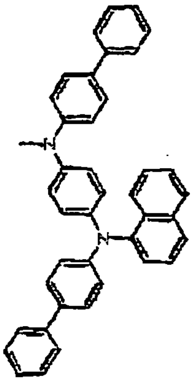

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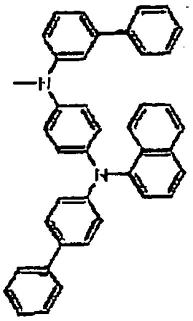

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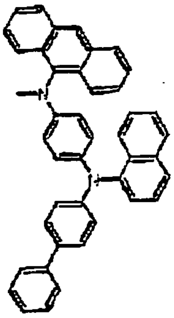

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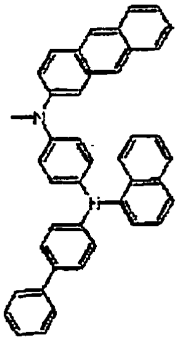

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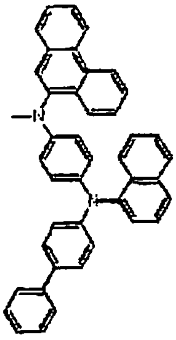

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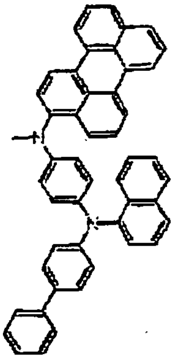

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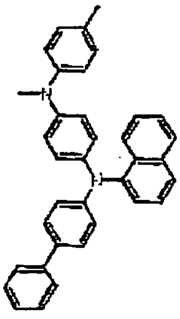

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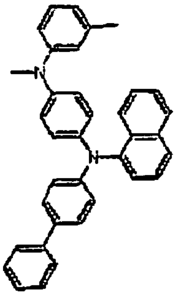

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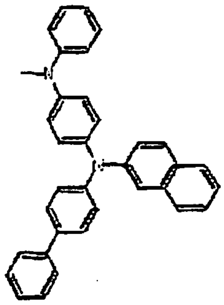
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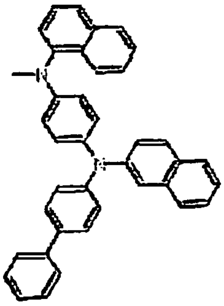
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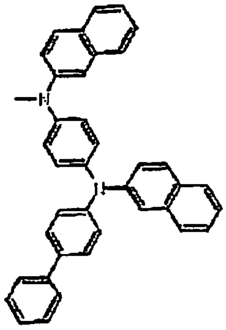
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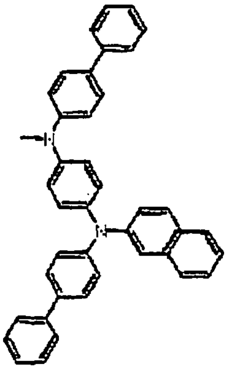
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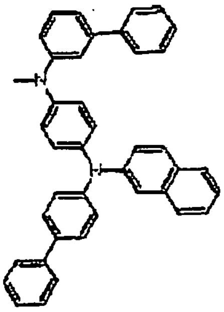
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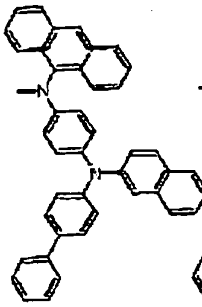
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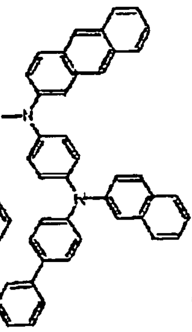
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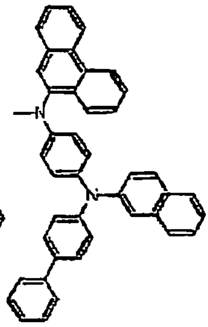
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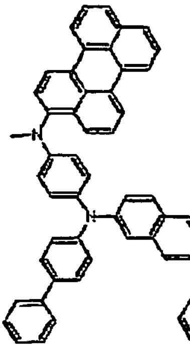
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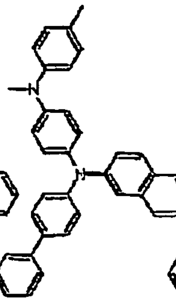
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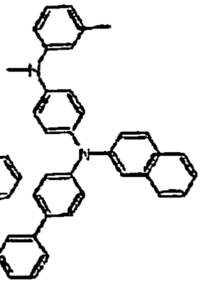
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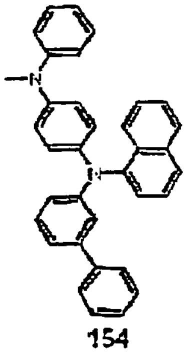
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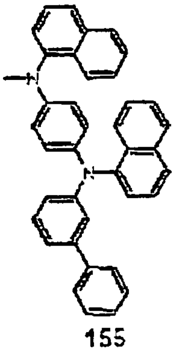
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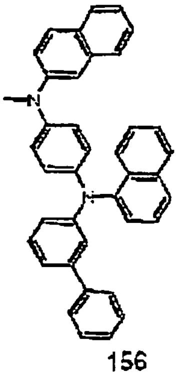
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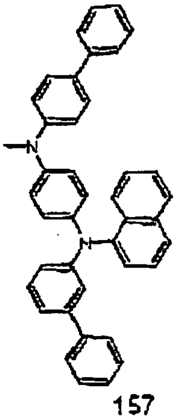
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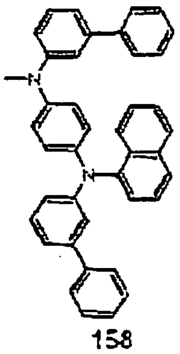
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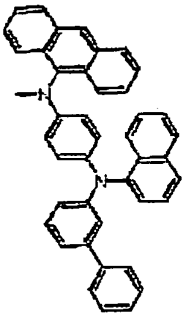
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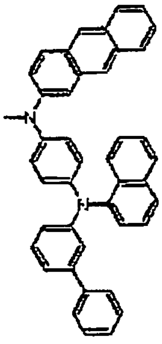
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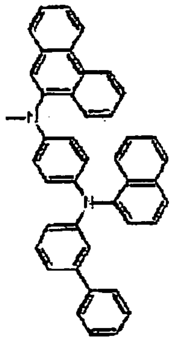
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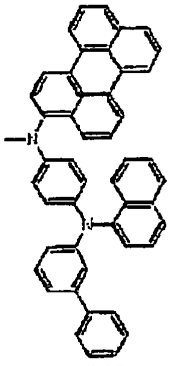
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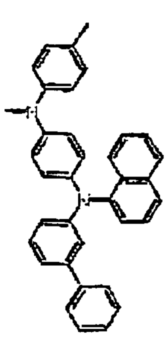
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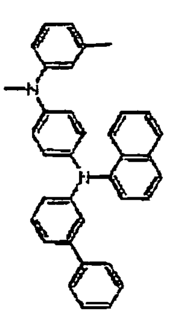
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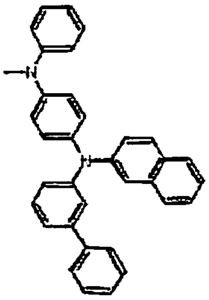
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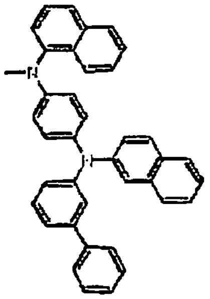
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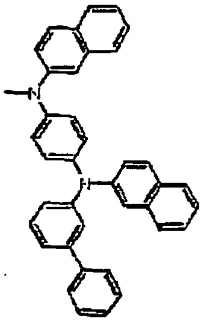
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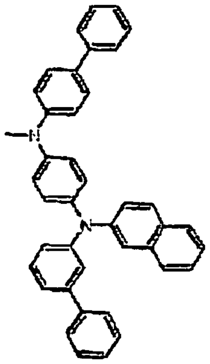
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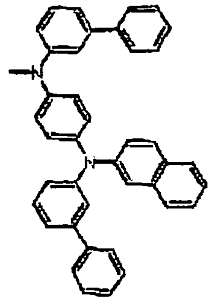
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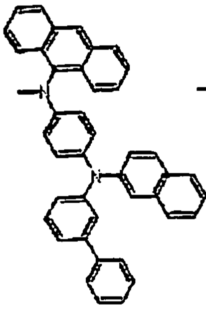
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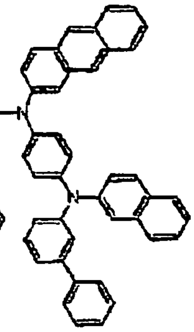
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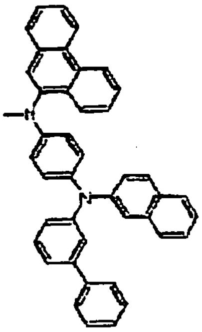
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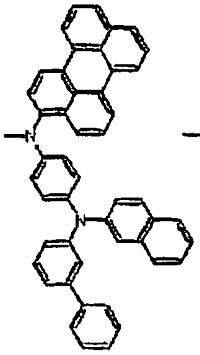
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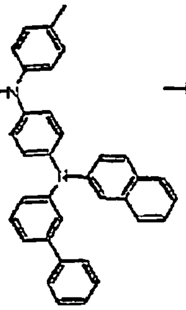
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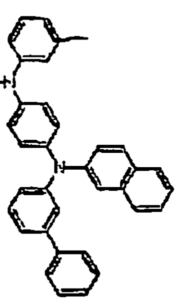
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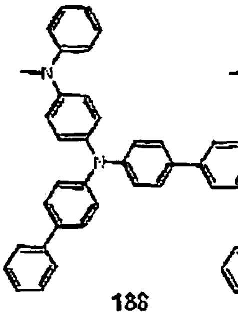

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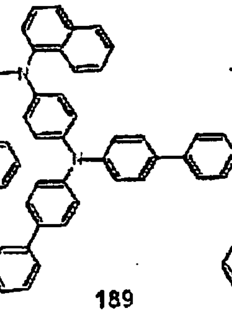

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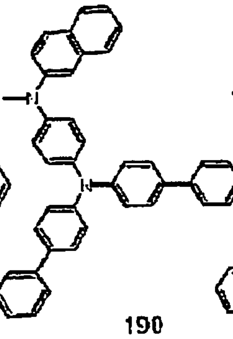

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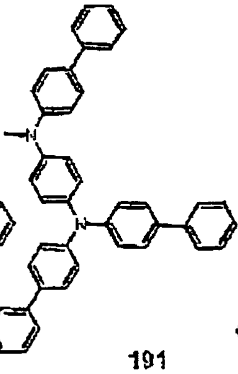

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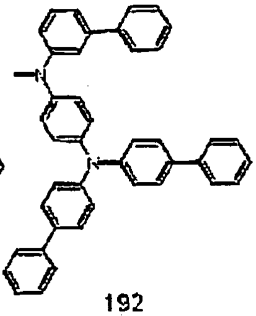

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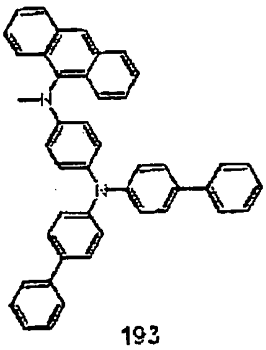

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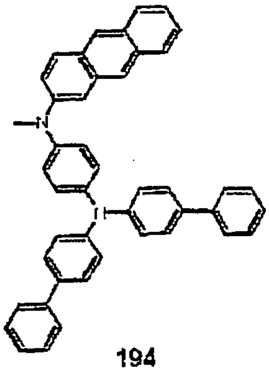

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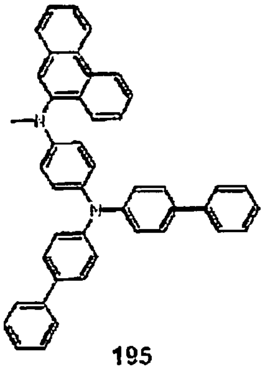

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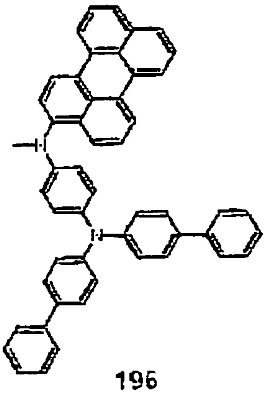

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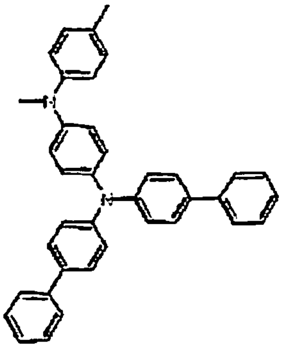

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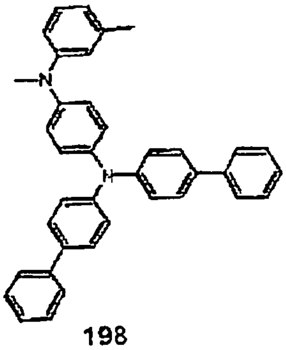

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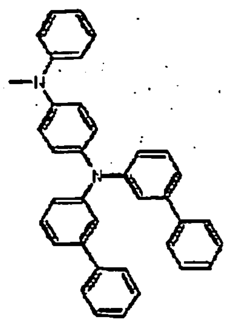

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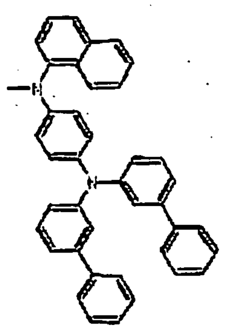

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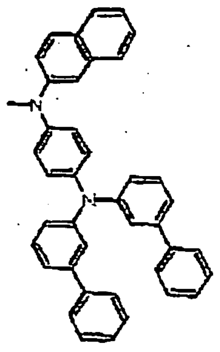

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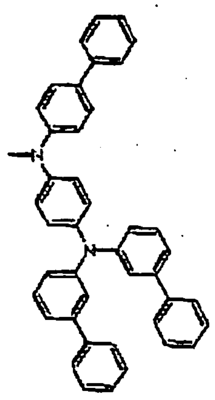

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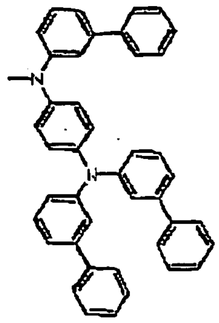

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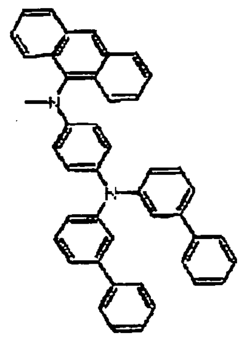

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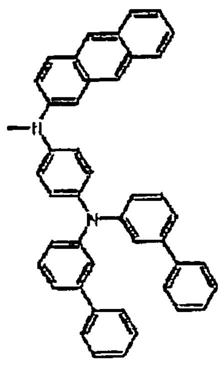

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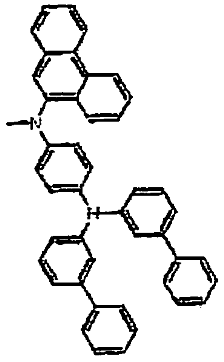

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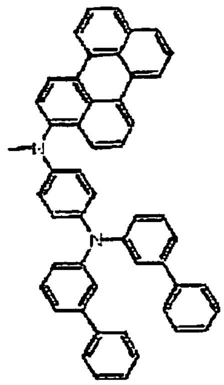

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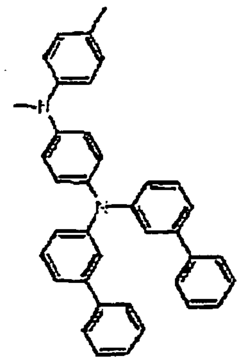

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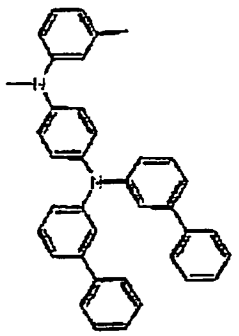

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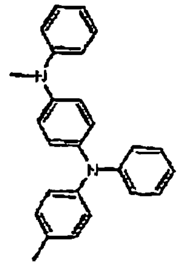

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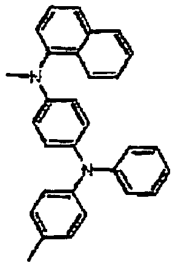

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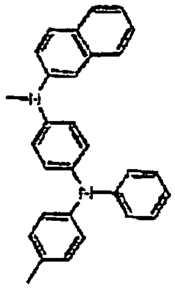

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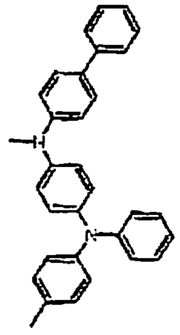

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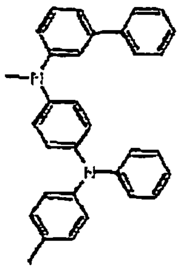

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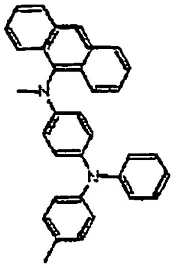

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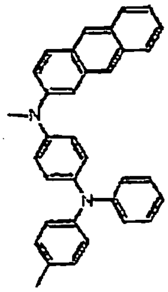

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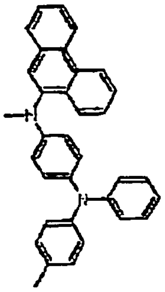

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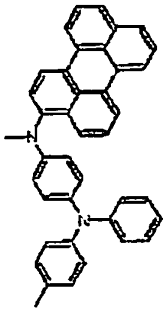

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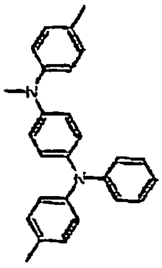

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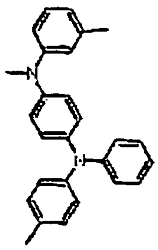

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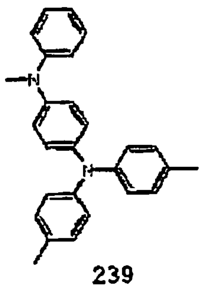

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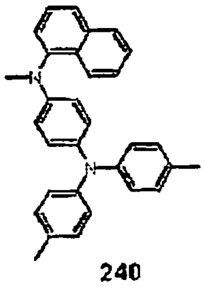

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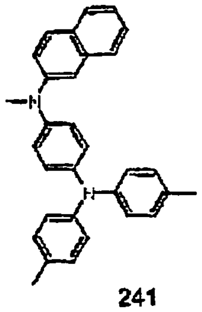

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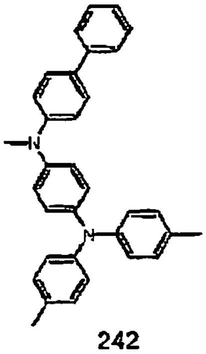

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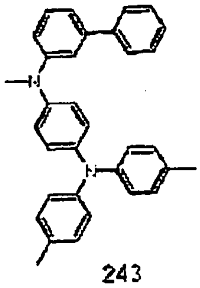

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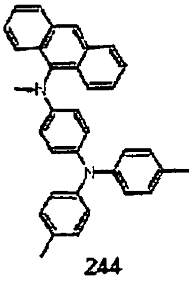
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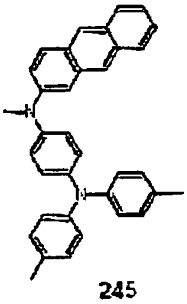
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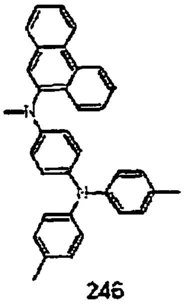
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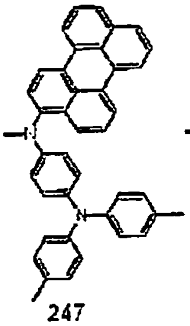
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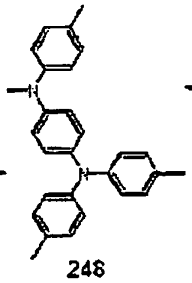
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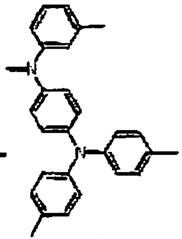
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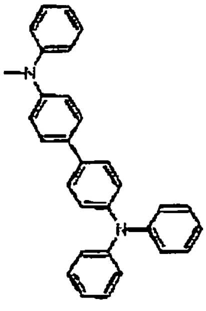
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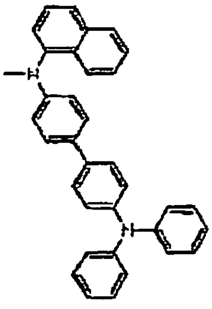
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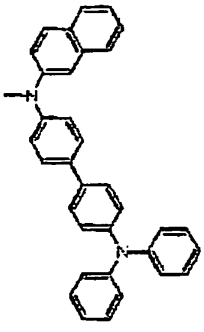
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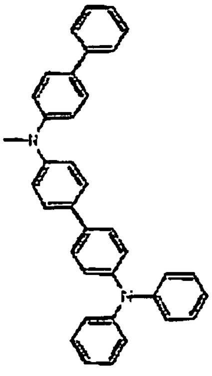
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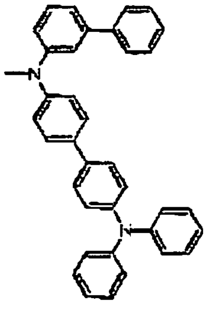
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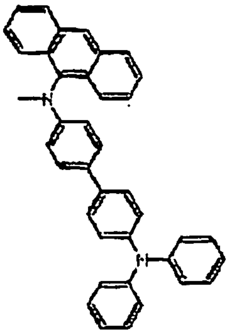
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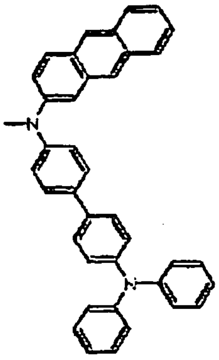
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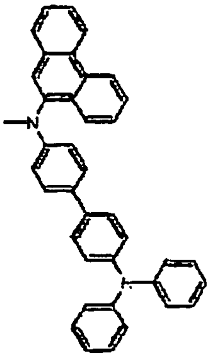
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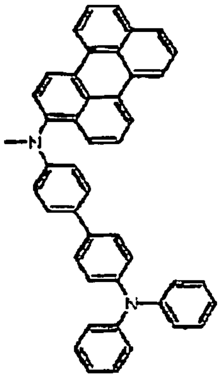
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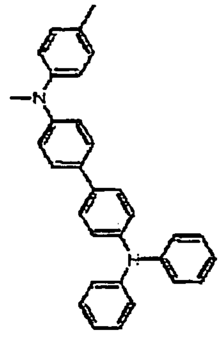

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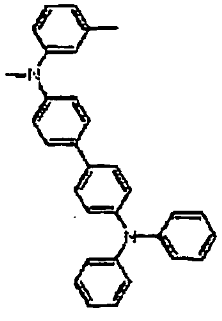

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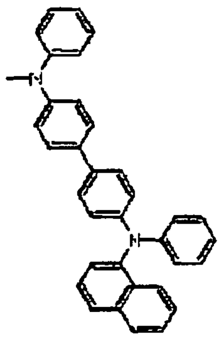

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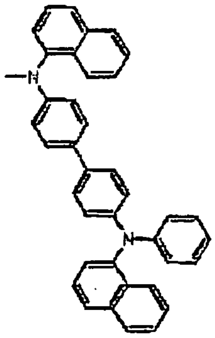

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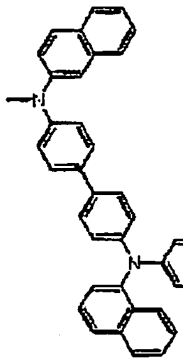

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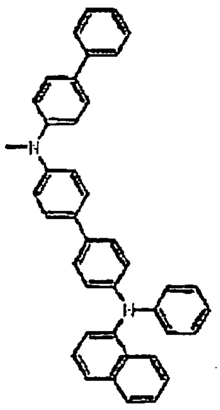

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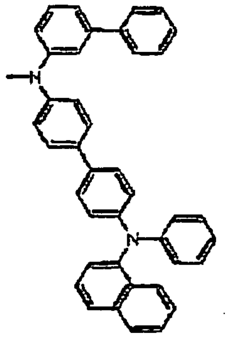

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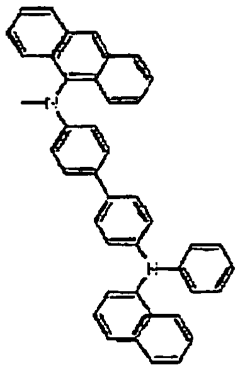

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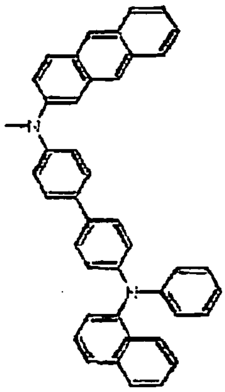

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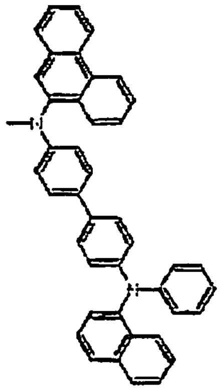

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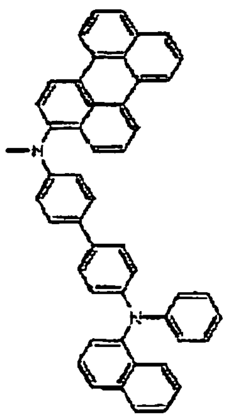

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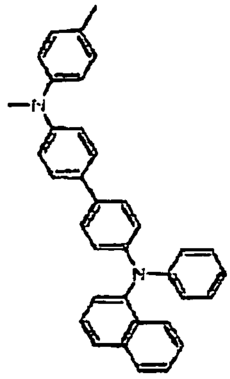

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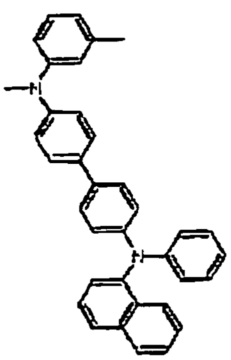

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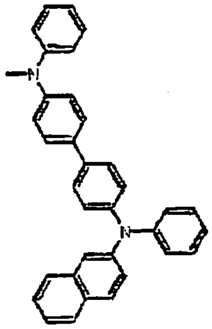

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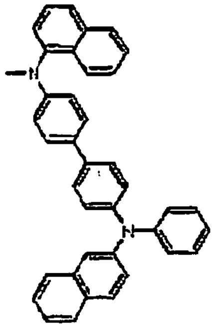

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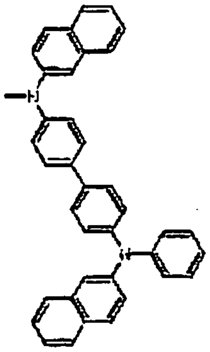

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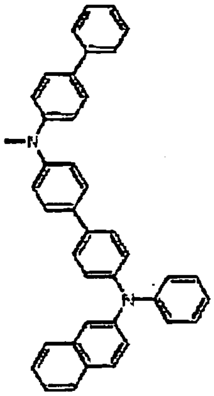

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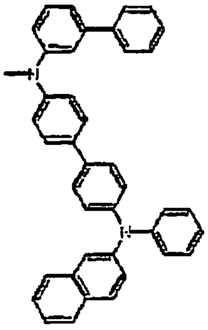

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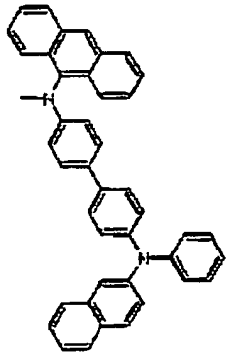

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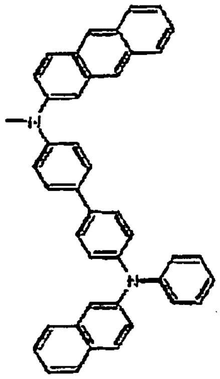

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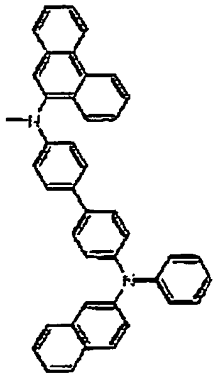

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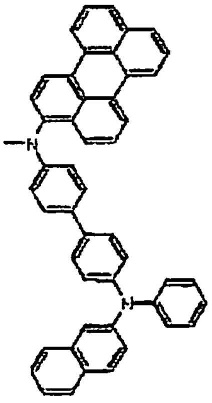

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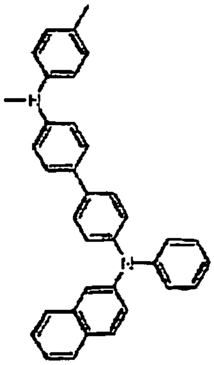

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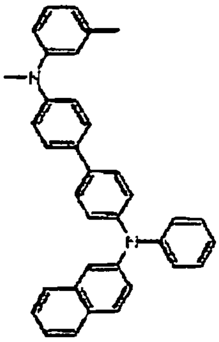

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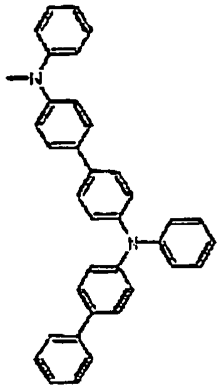

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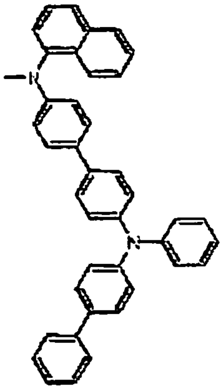

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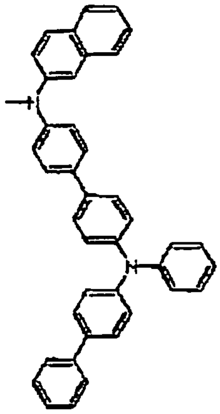

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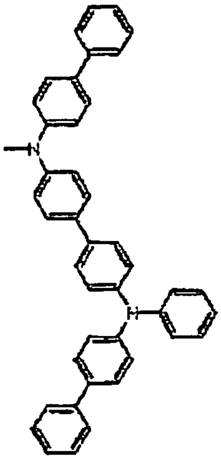

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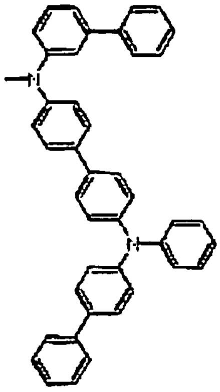

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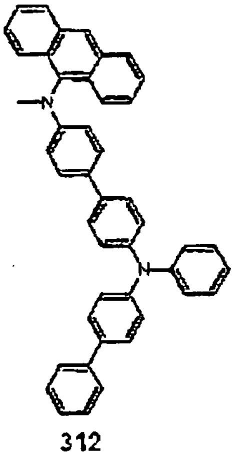

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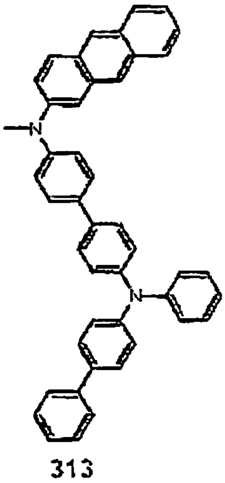

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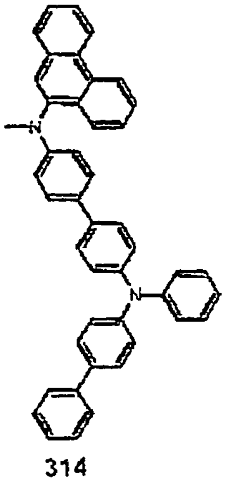

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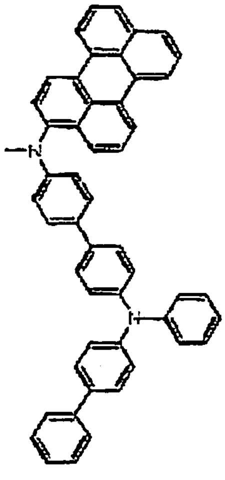

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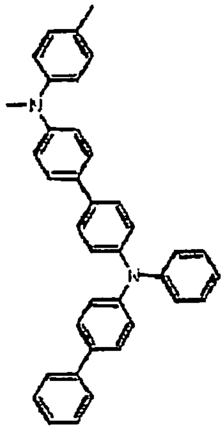

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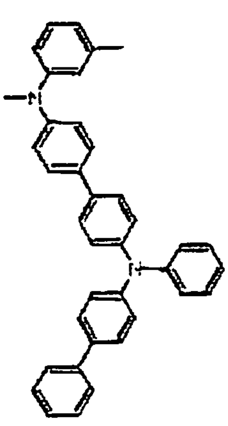

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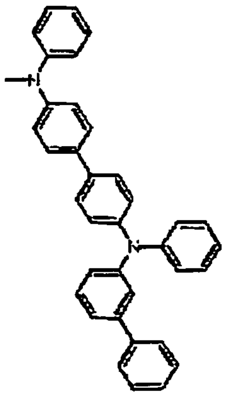

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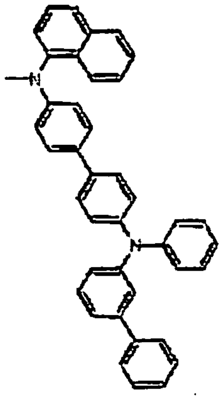

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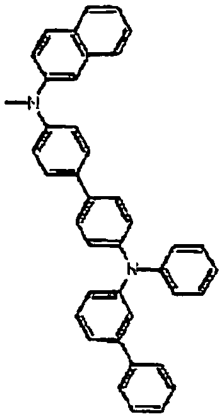

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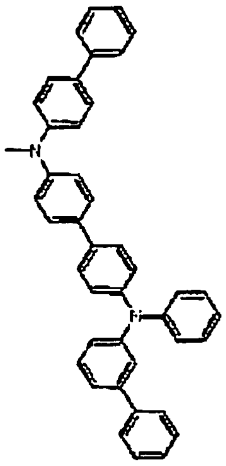

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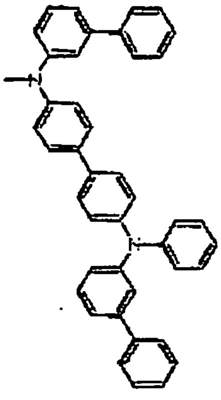

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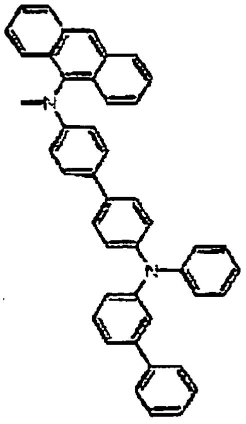

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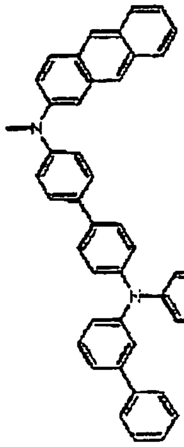

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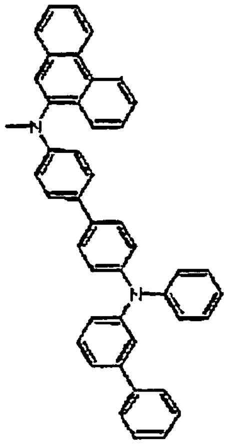

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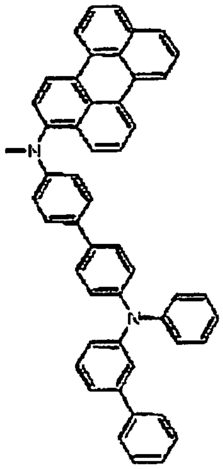

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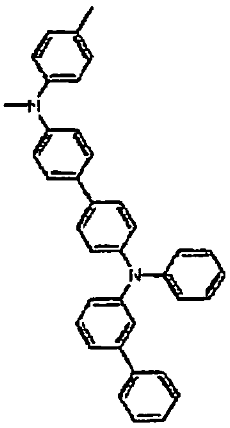

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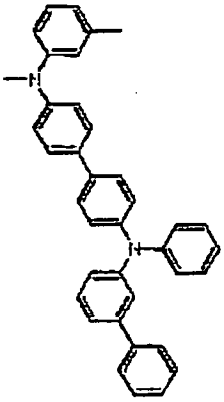

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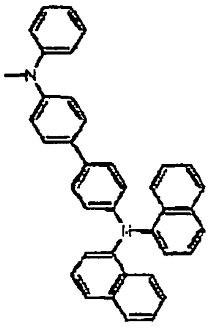

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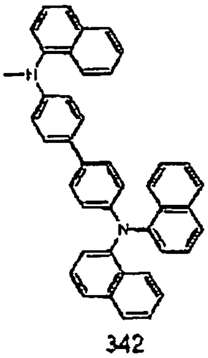

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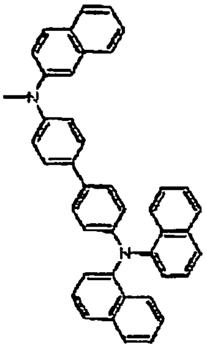

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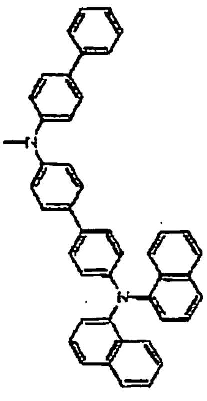

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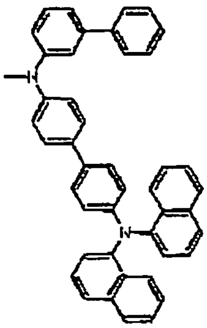

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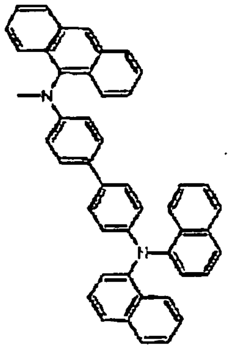

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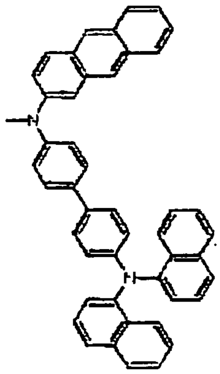

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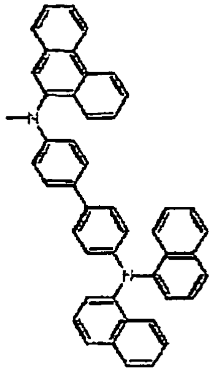

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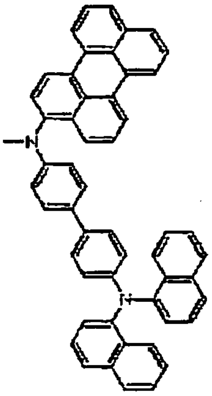

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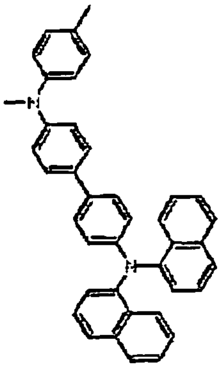

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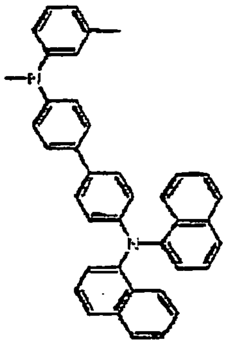

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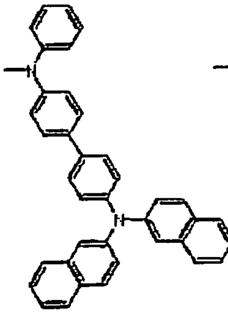

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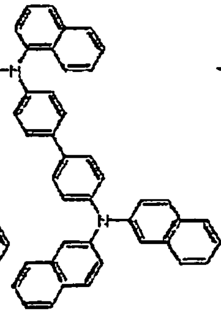

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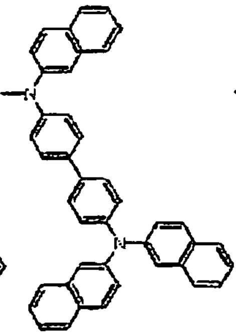

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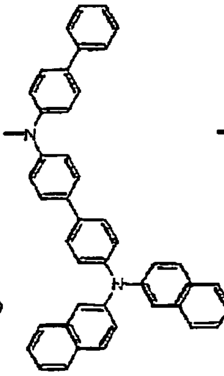

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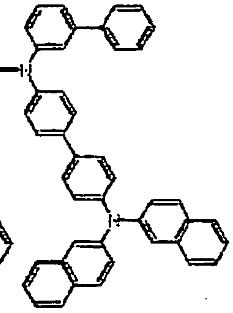

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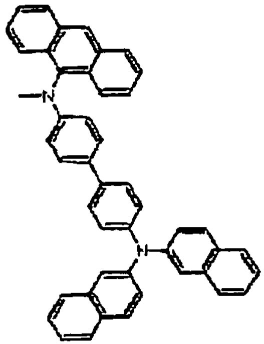

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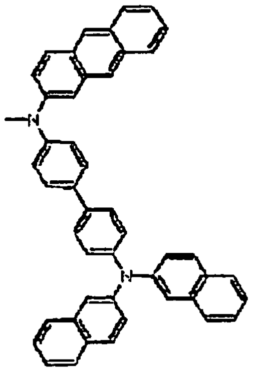

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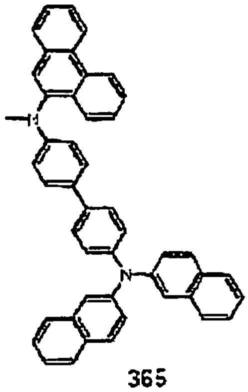

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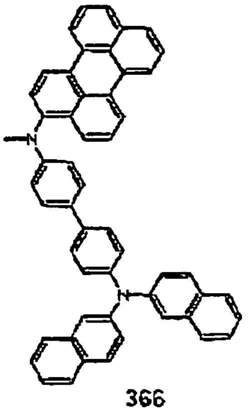

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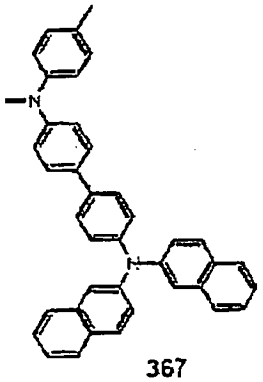

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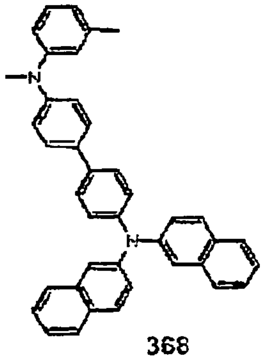

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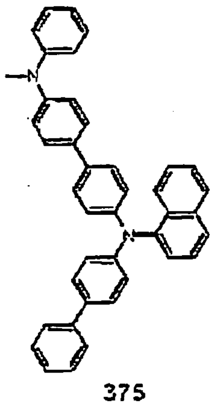

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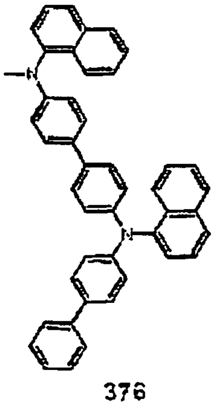

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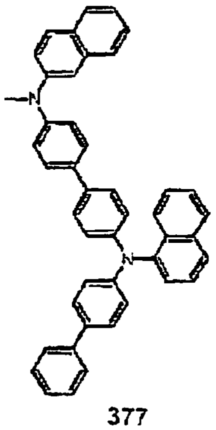

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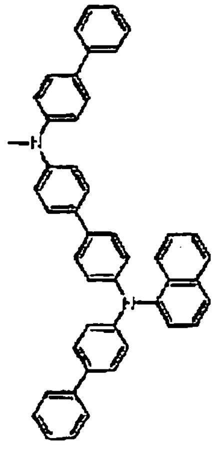

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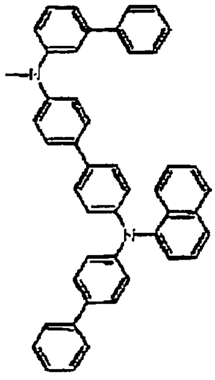

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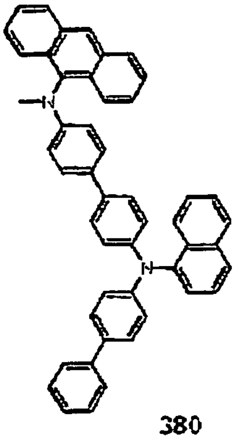

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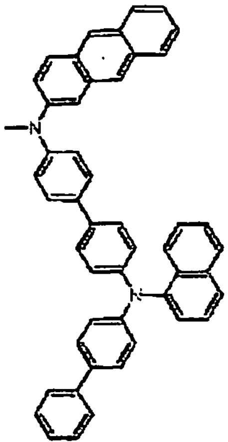

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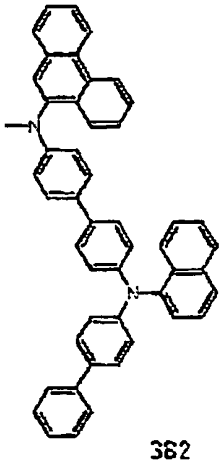

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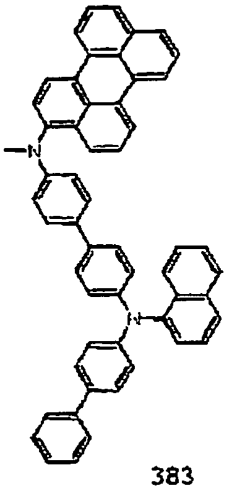

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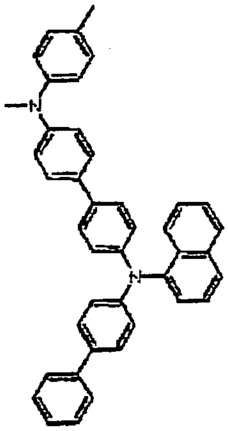

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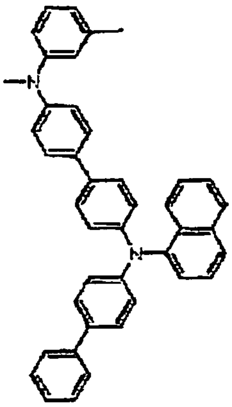

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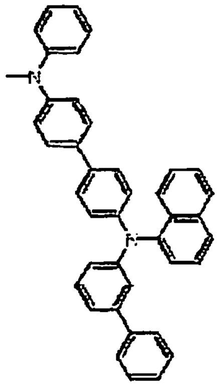

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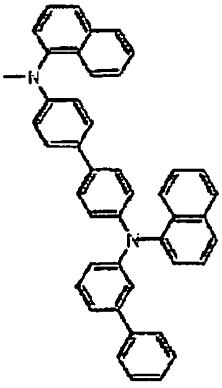

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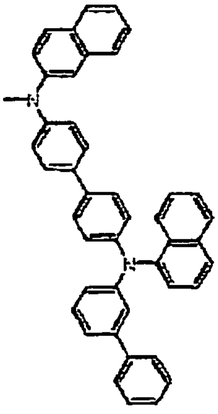

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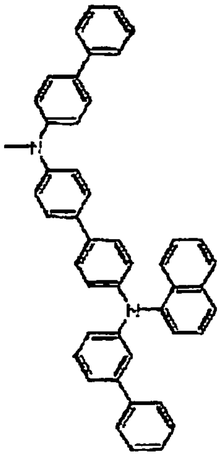

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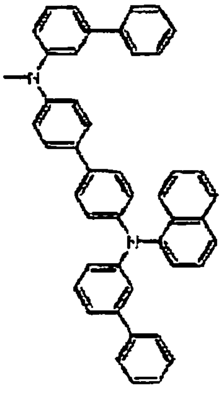

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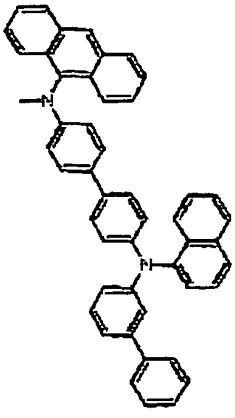

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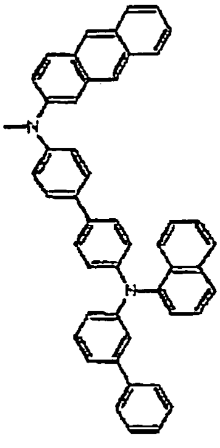

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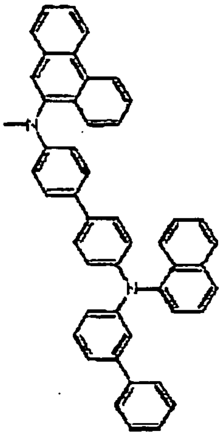

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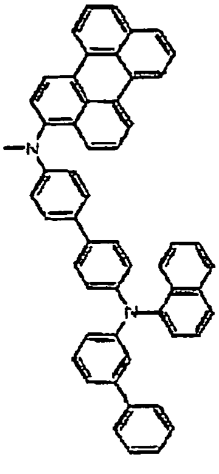

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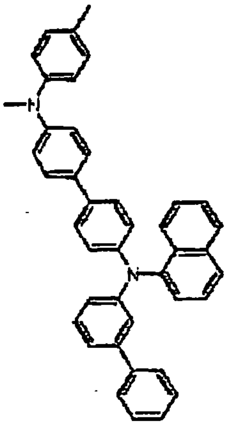

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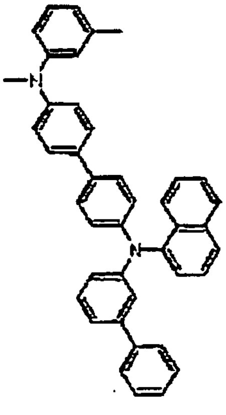

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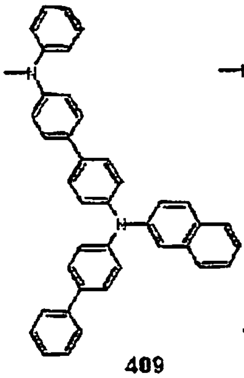

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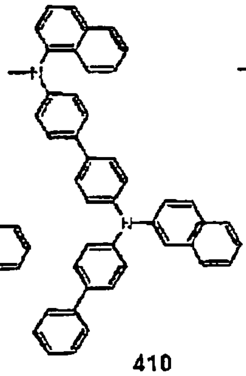

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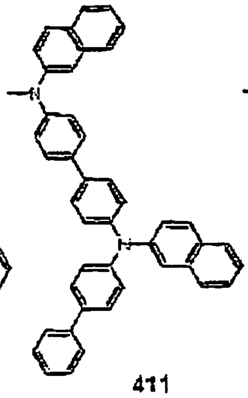

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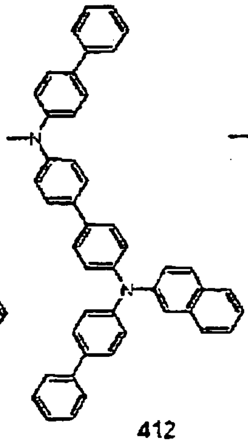

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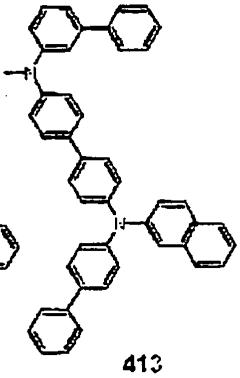

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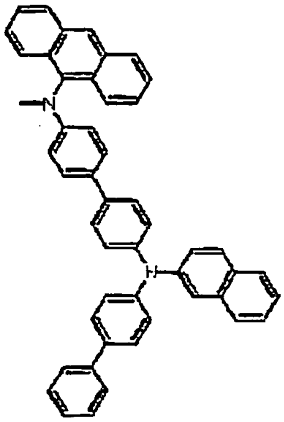

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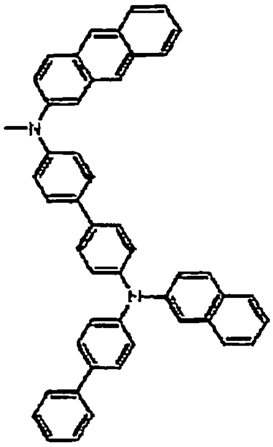

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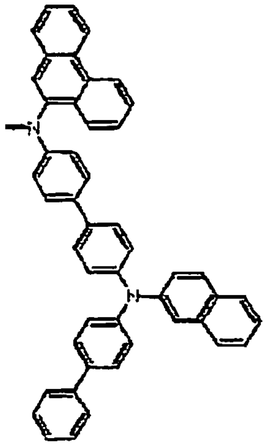

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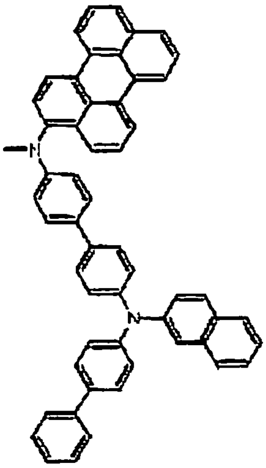

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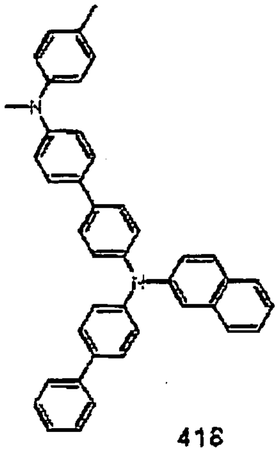

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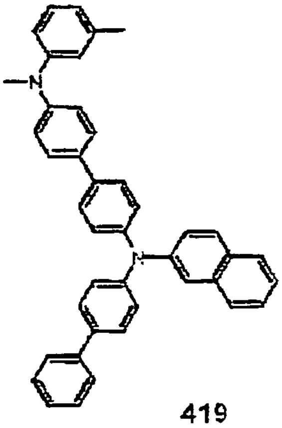

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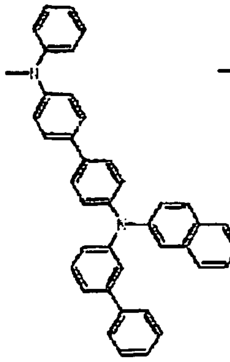
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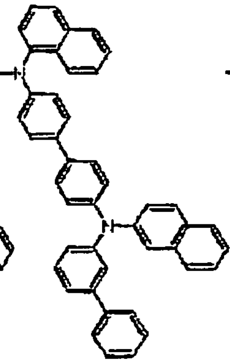
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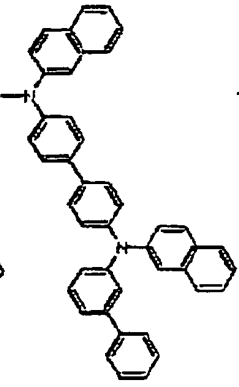
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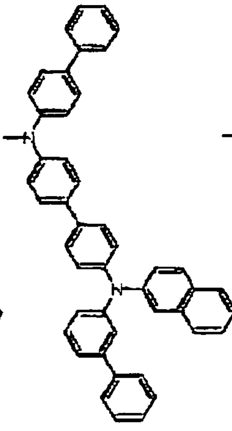
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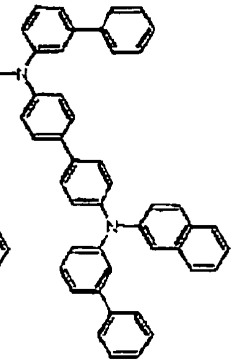
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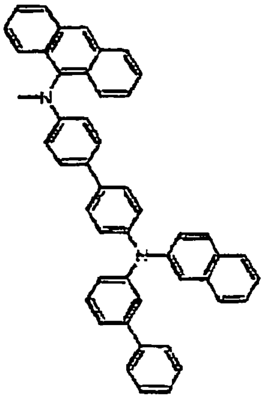
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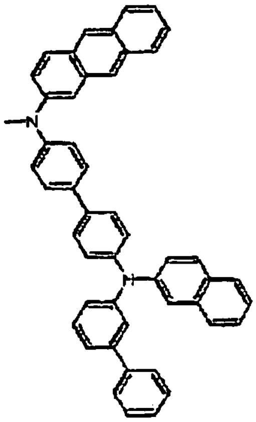
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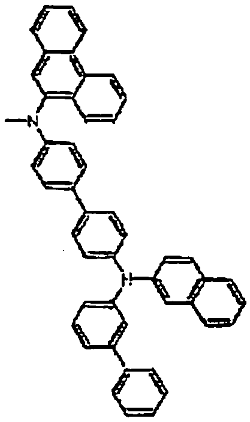
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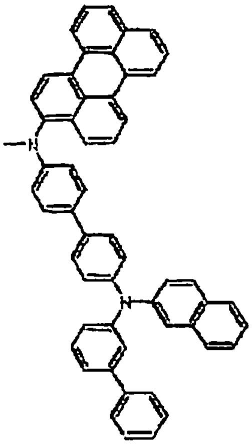
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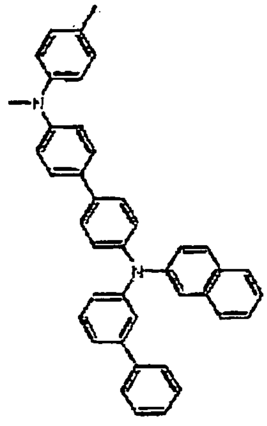

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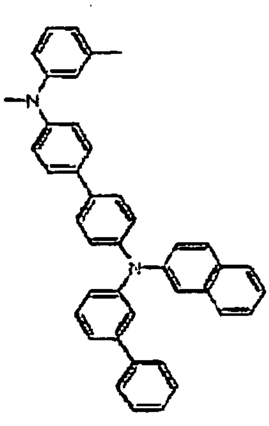

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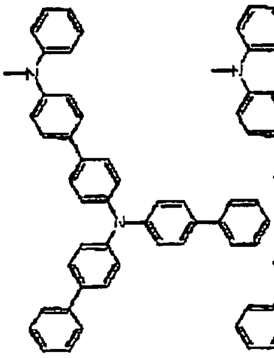

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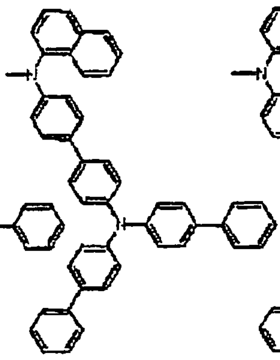

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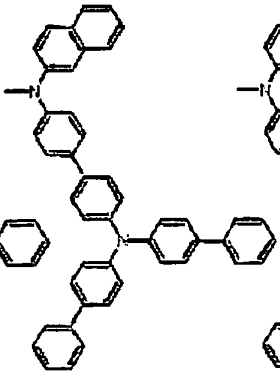

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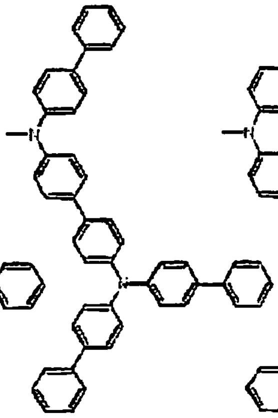

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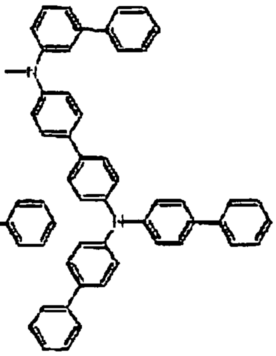

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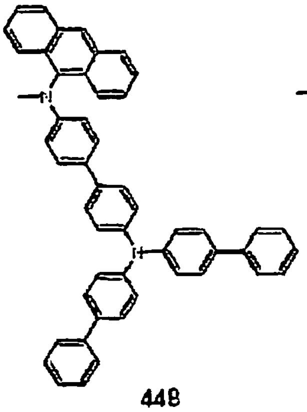

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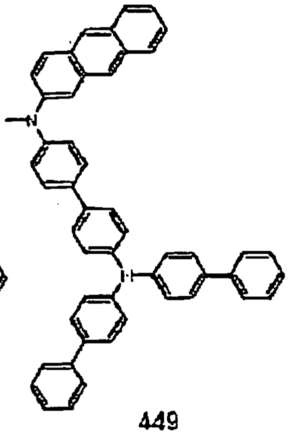

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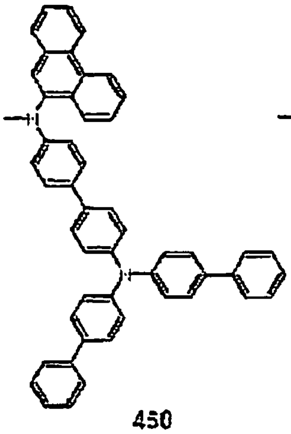

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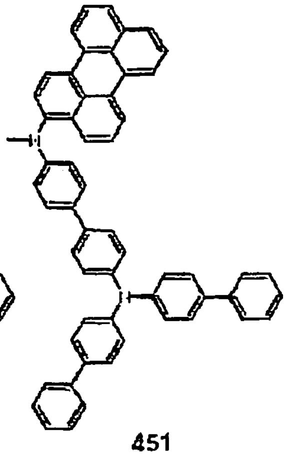

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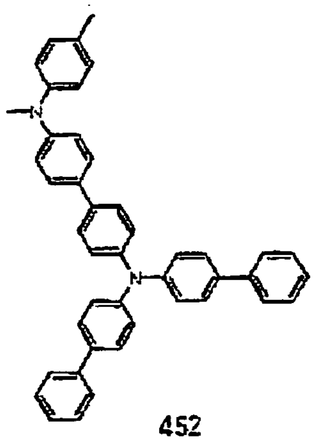

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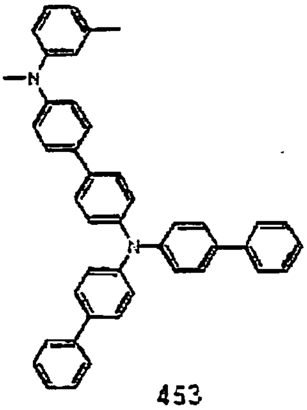

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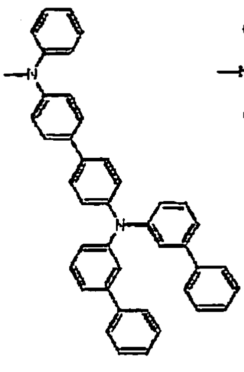

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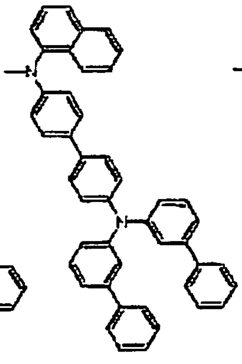

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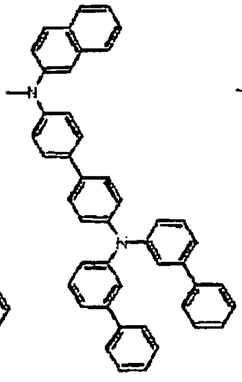

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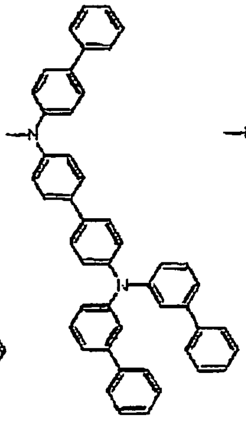

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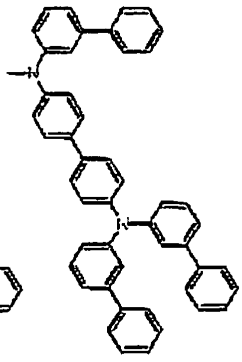

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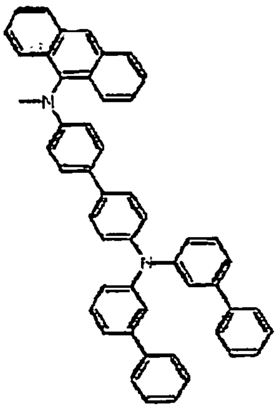

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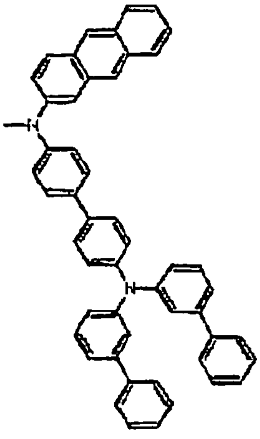

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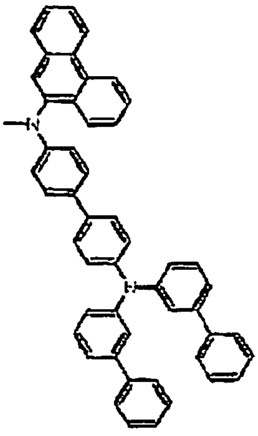

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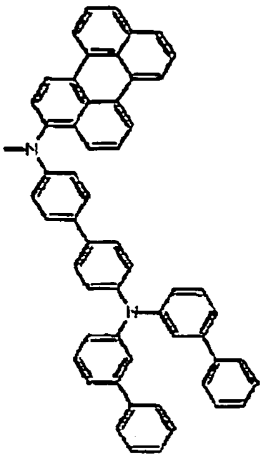

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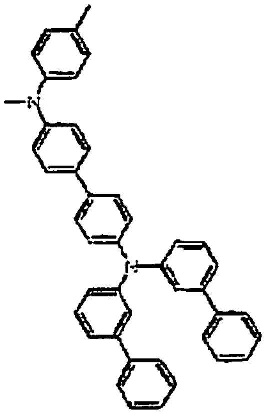

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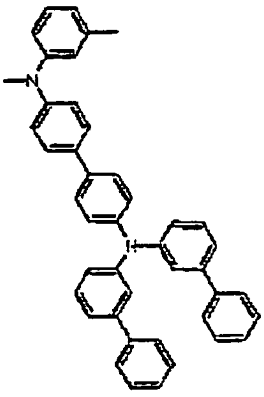
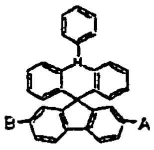


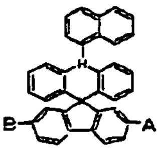
470

Revendications

1. Dispositif électroluminescent organique comprenant :

   une première électrode ;
   des couches de matière organique comprenant une couche électroluminescente et l'une d'une couche d'injection de trous, d'une couche de transport de trous et d'une couche qui à la fois injecte et transporte des trous ; et une seconde électrode ;
   dans lequel la première électrode, les couches de matière organique et la seconde électrode forment une structure stratifiée ; et
   la couche d'injection de trous, la couche de transport de trous ou la couche qui à la fois injecte et transporte des trous comprend un composé représenté par une des formules suivantes .





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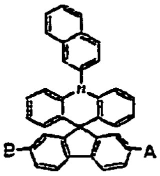
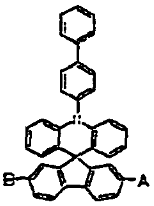
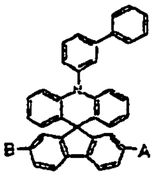
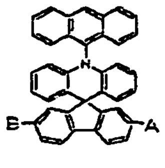
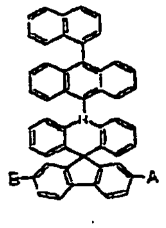
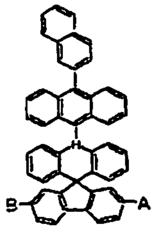


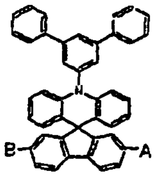


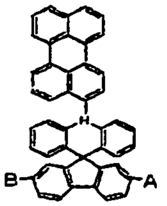


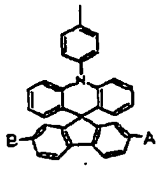


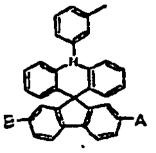


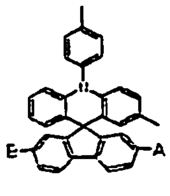


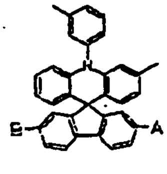


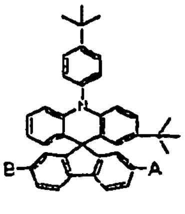


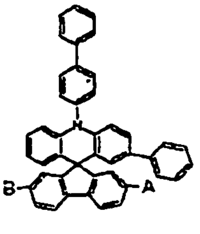




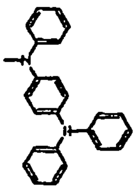








dans lesquelles A et B représentent chacun indépendamment un des groupes suivantes :



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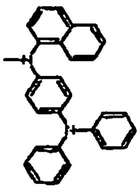

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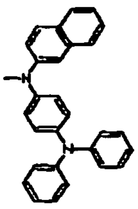

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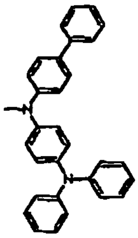

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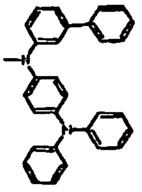

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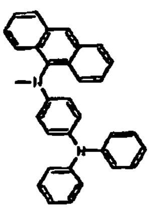

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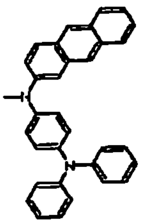

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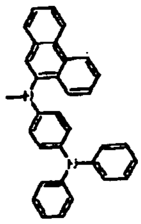

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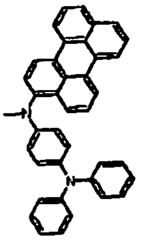

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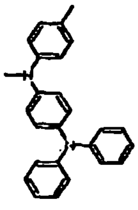

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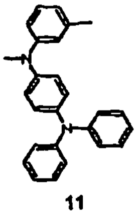

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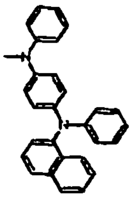
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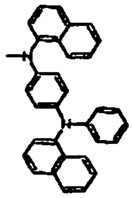
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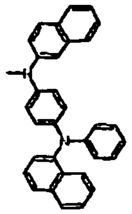
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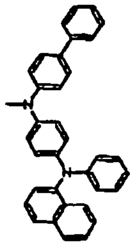
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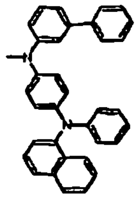
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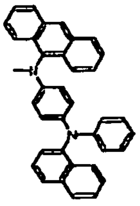
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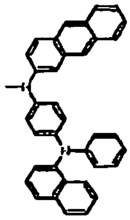
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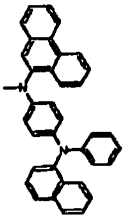
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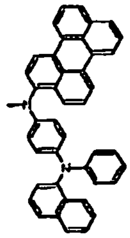
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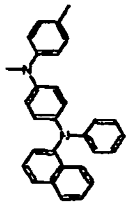
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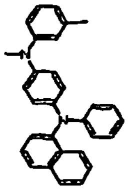
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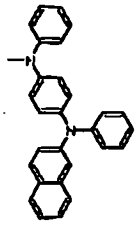
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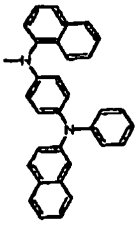
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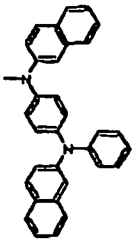
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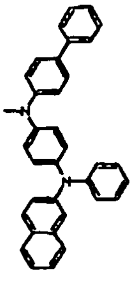
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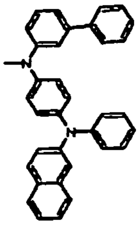
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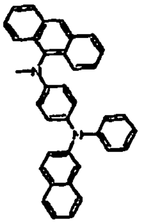
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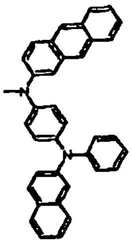
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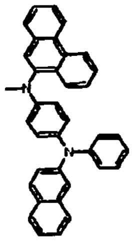
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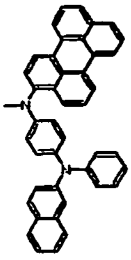
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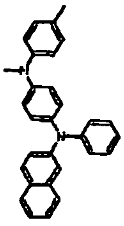
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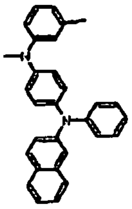
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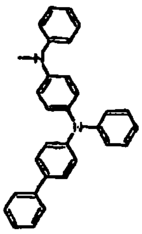
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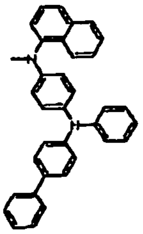
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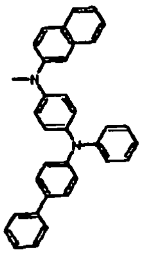
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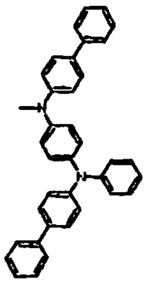
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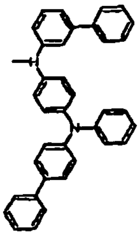
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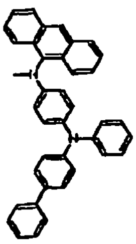
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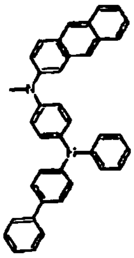
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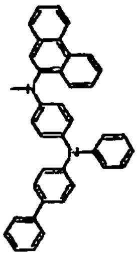
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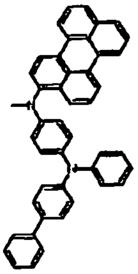
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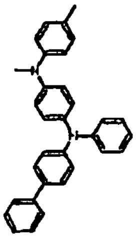
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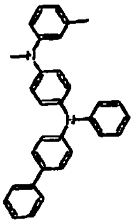
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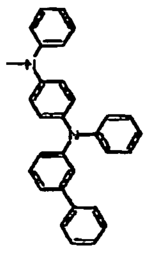
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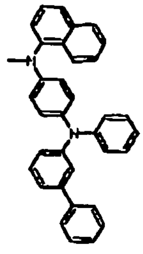
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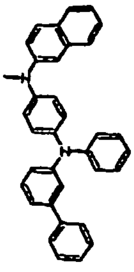
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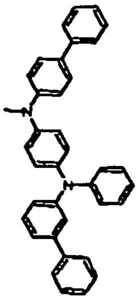
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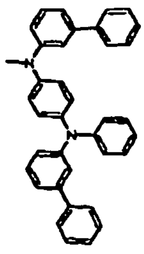
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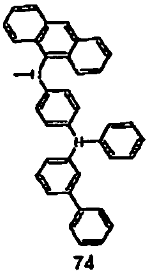
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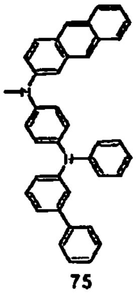
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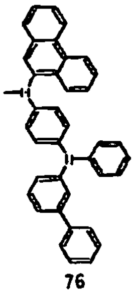
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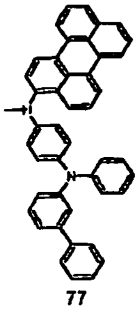
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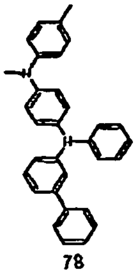
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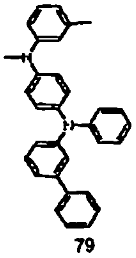
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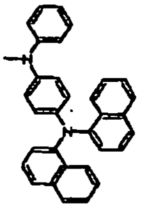
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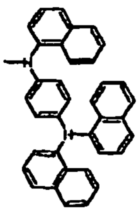
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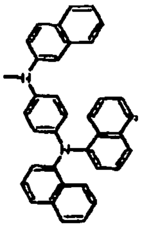
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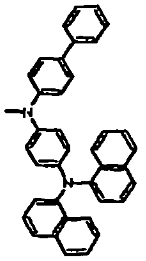
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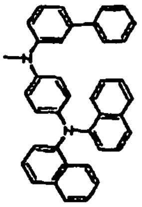
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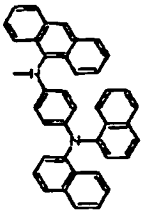
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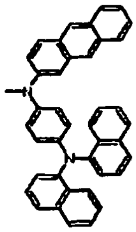
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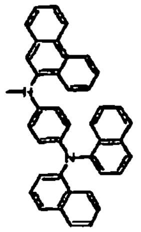
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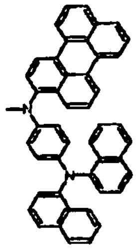
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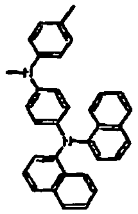
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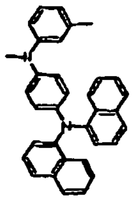
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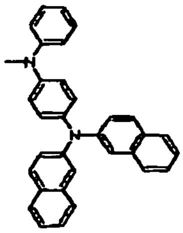
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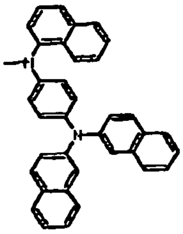
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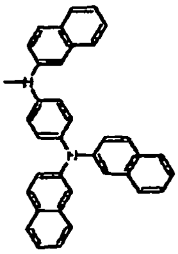
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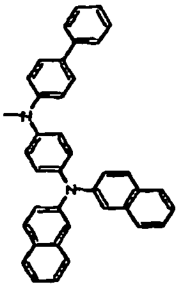
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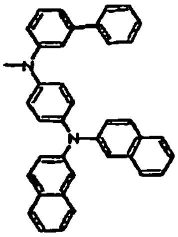
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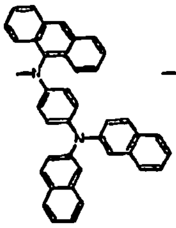
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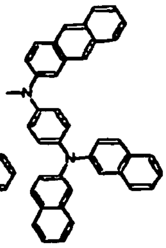
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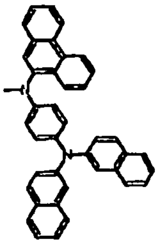
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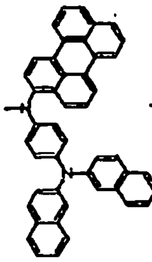
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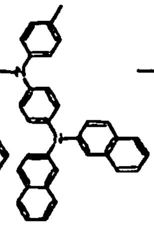
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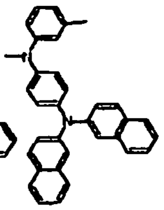
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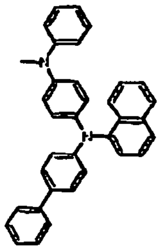
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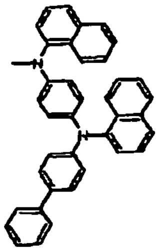
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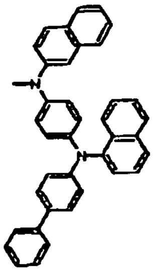
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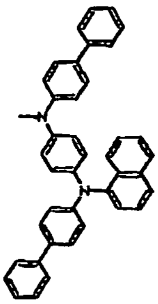
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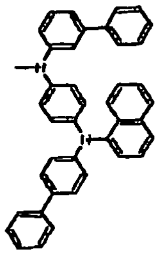
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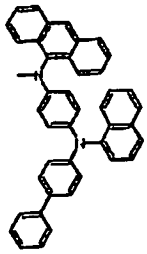
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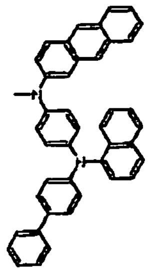
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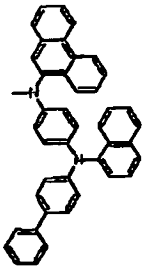
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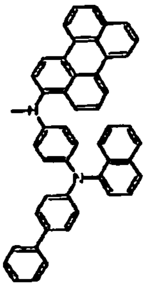
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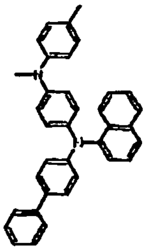
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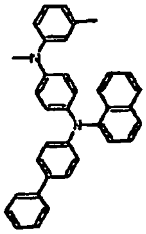
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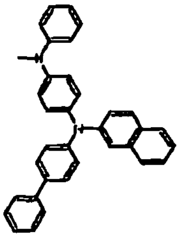
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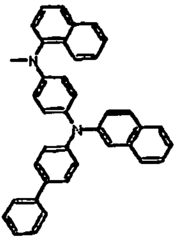
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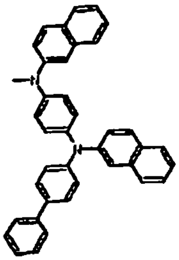
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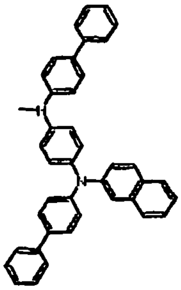
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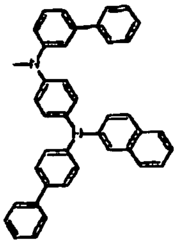
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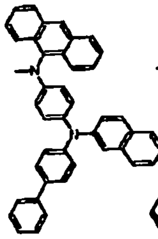
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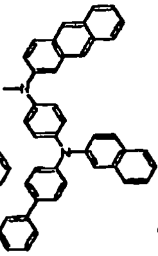
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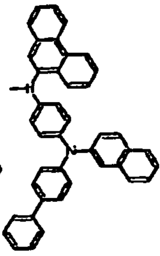
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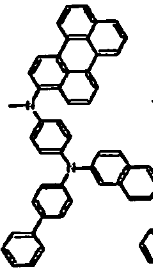
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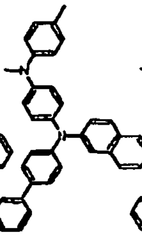
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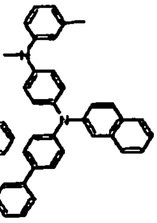
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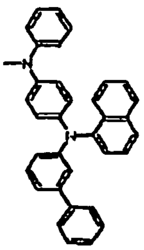
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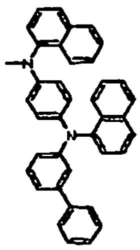
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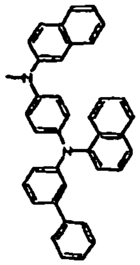
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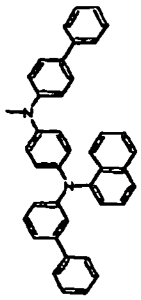
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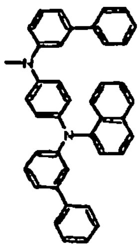
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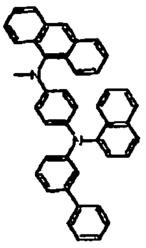
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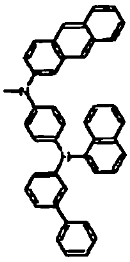
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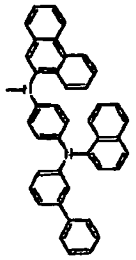
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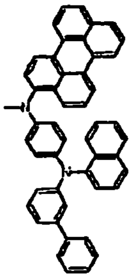
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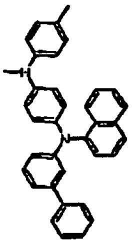
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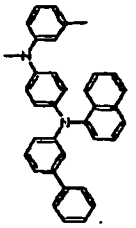
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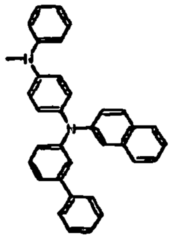
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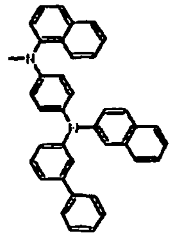
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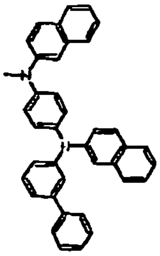
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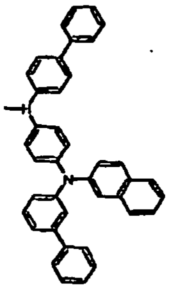
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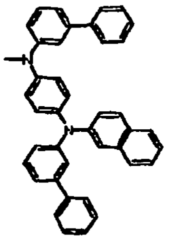
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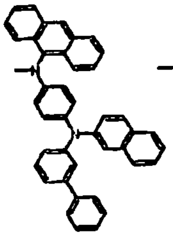
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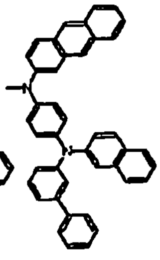
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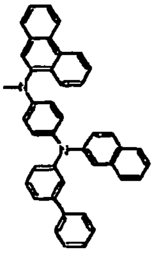
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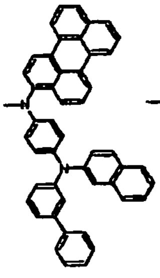
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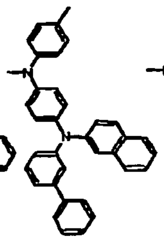
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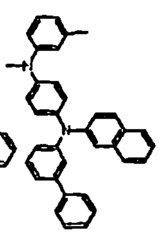
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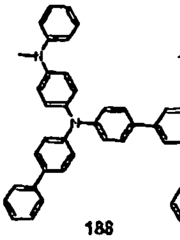
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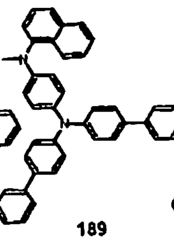
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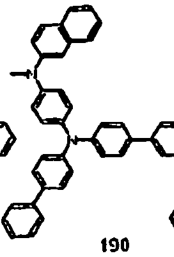
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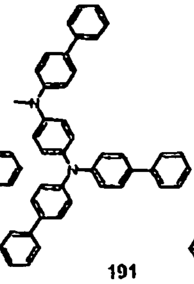
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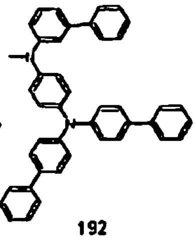
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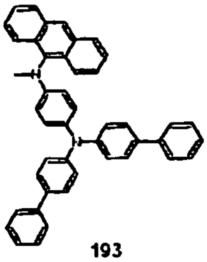
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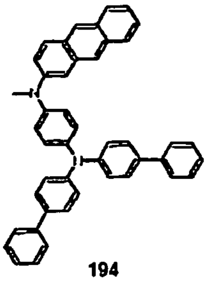
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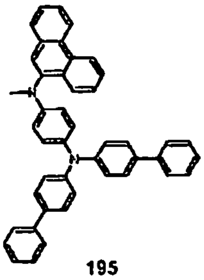
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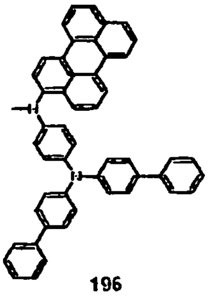
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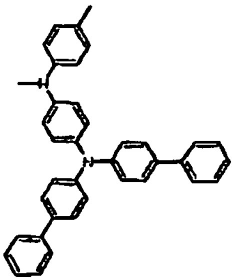
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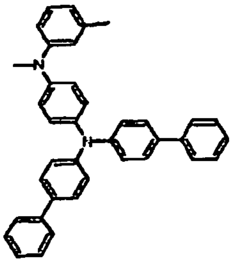
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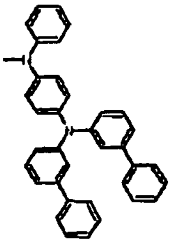
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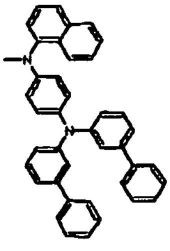
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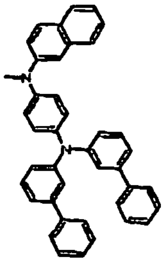
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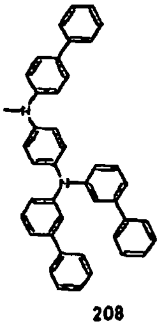
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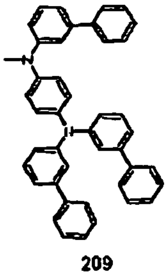
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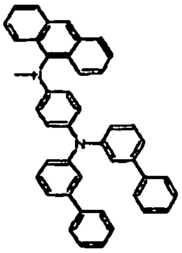
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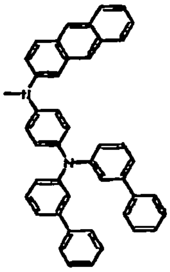
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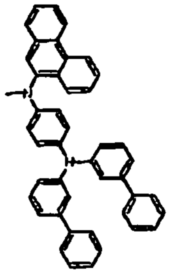
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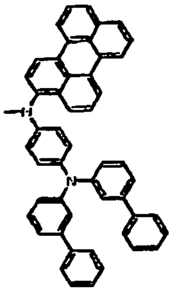
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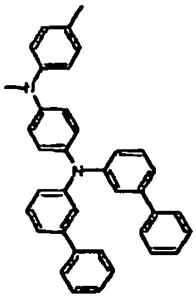
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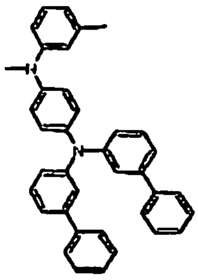
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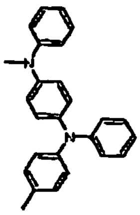
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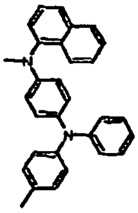
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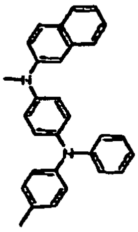
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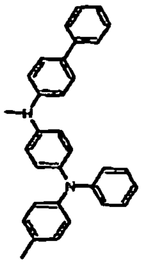
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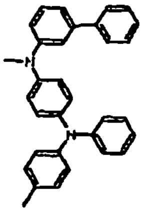
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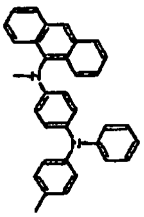
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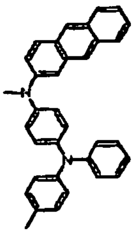
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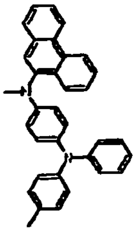
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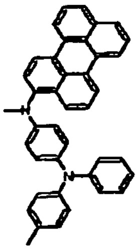
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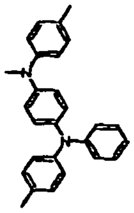
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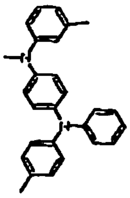
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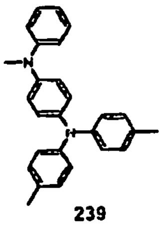
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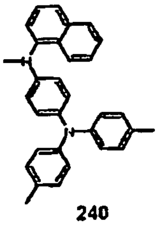
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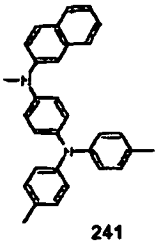
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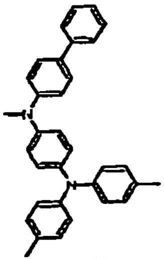
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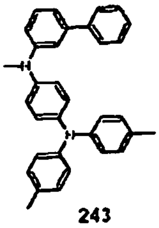
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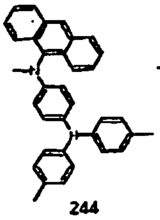
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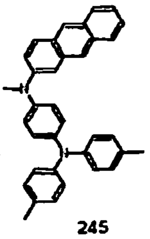
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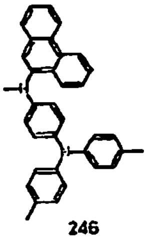
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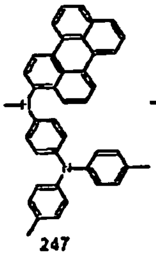
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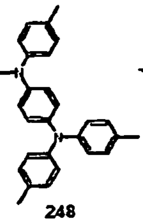
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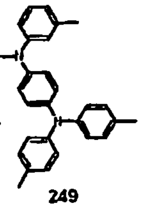
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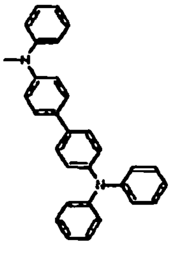
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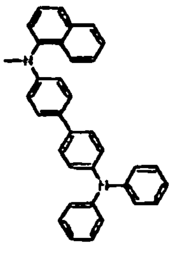
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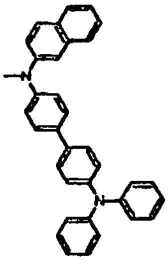
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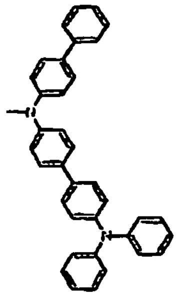
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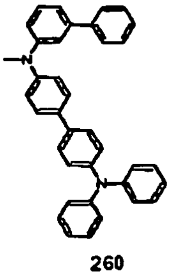
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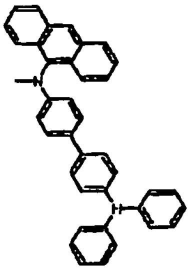
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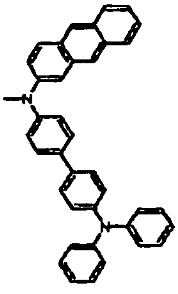
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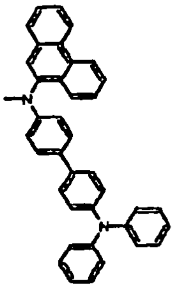
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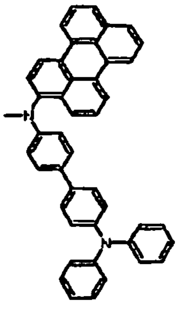
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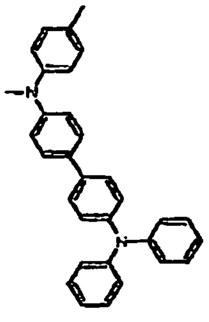

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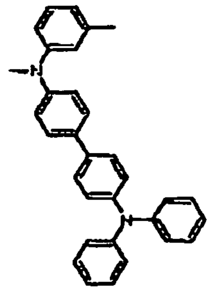

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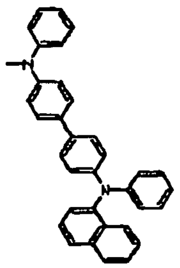

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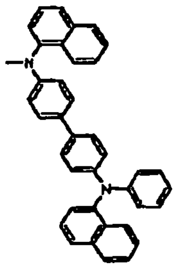

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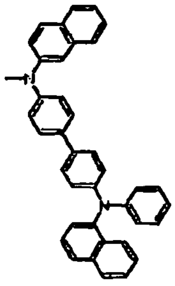

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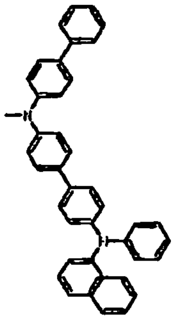

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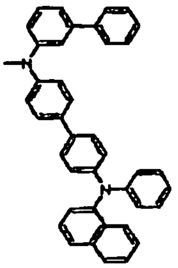

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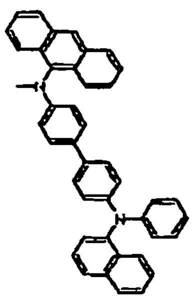

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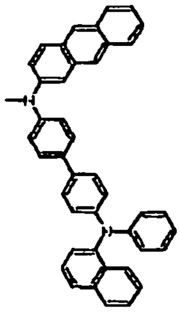

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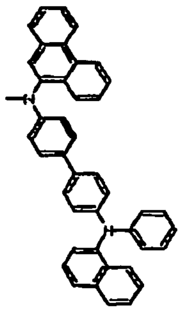

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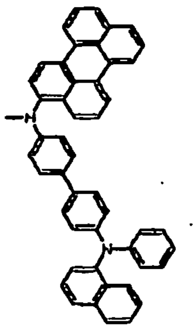

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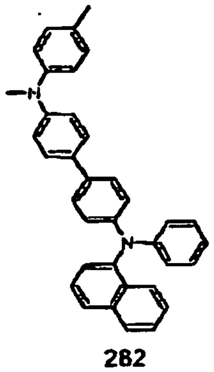

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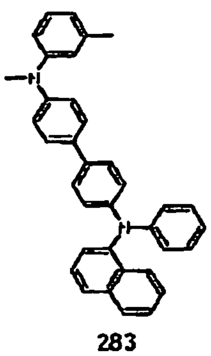

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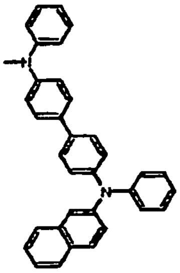

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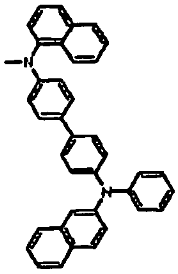

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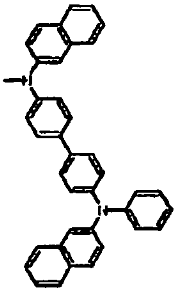

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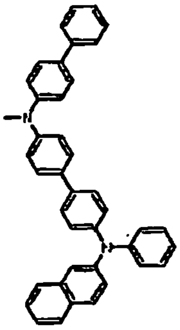

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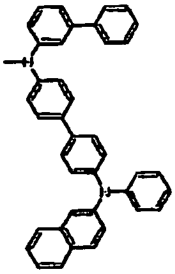

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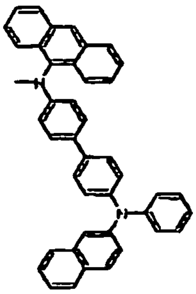

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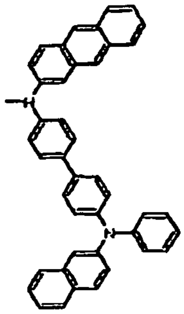

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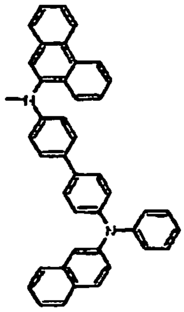

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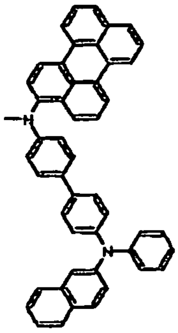

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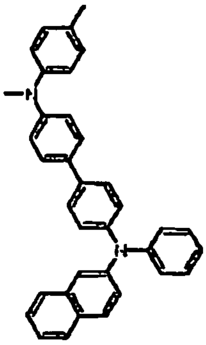

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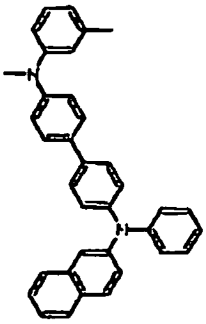

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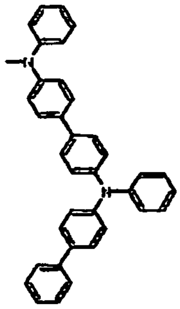

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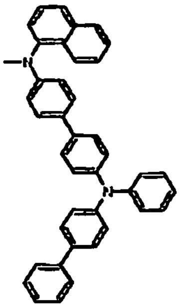

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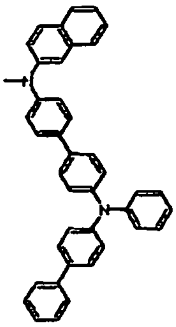

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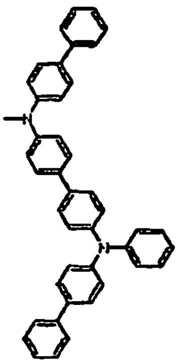

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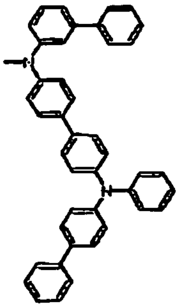

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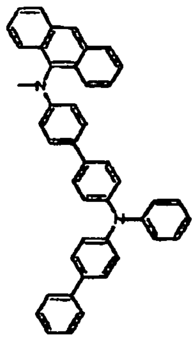
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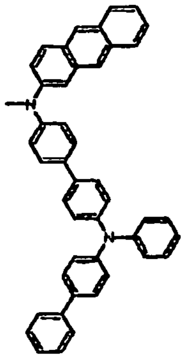
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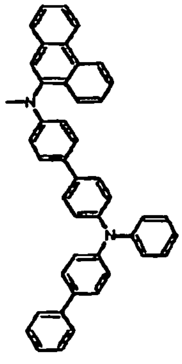
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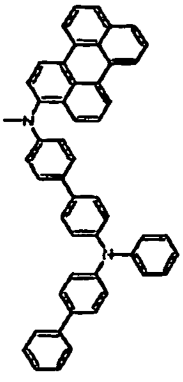
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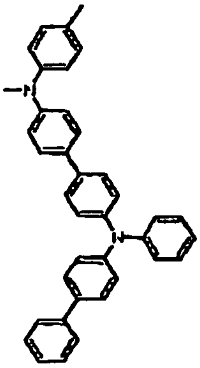
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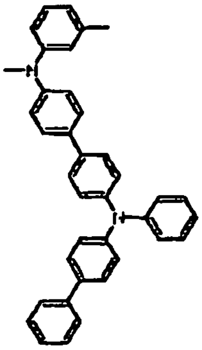
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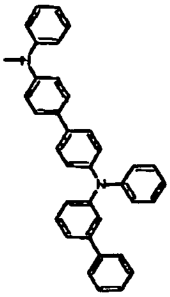
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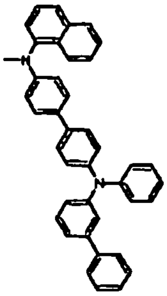
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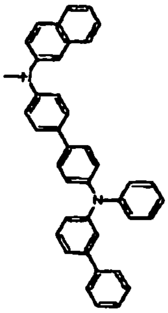
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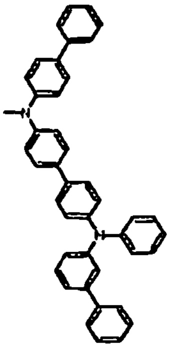
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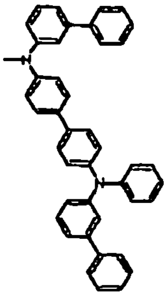
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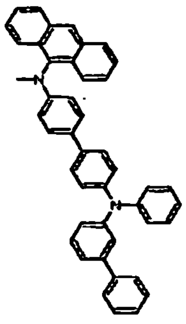
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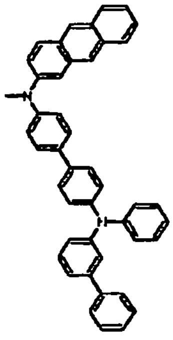
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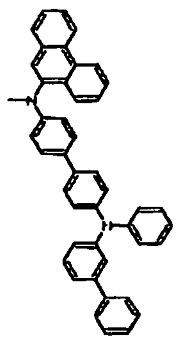
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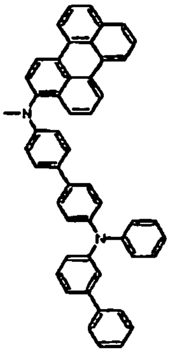
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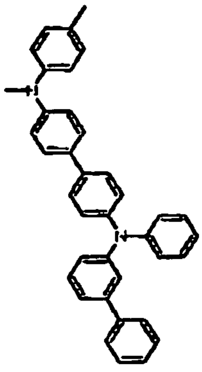
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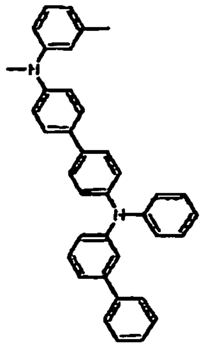
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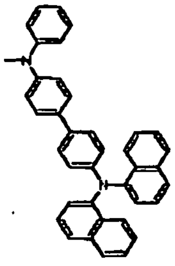
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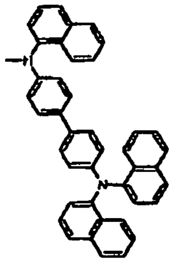
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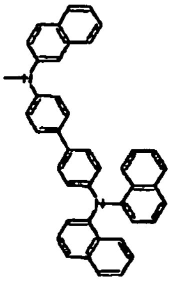
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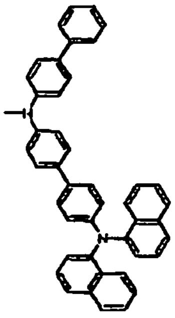
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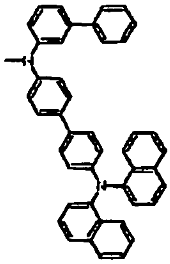
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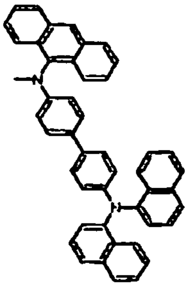

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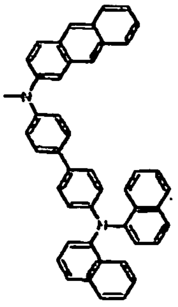

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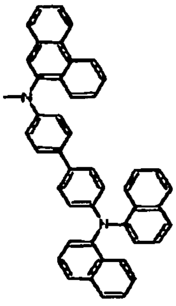

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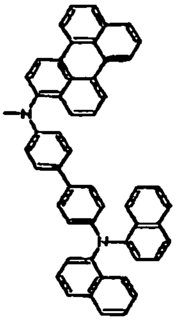

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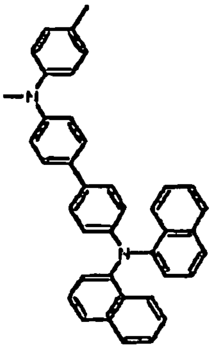

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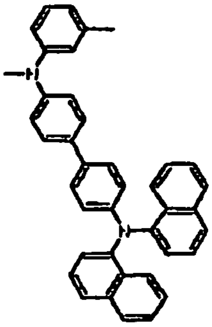

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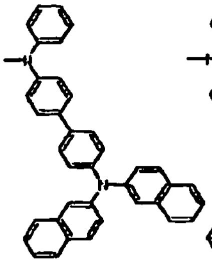

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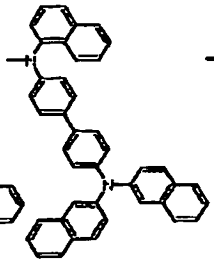

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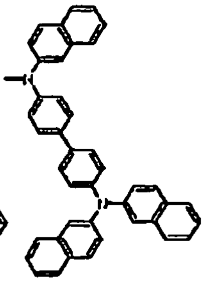

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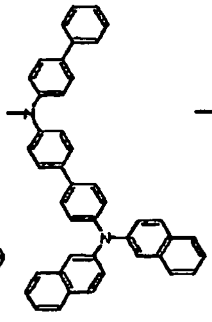

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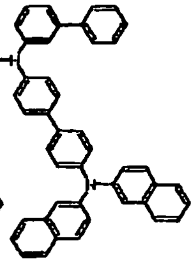

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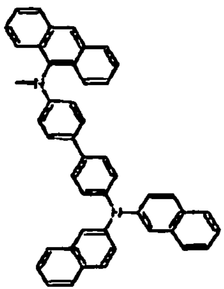
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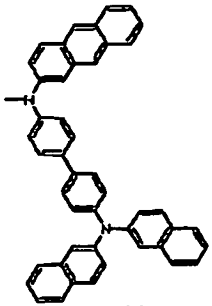
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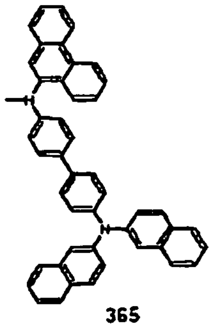
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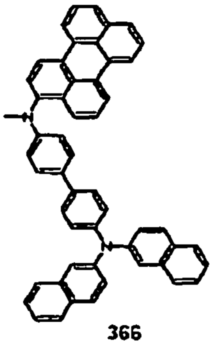
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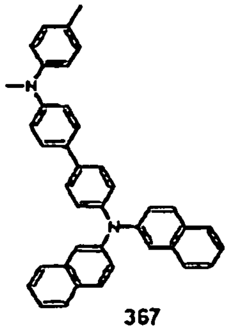
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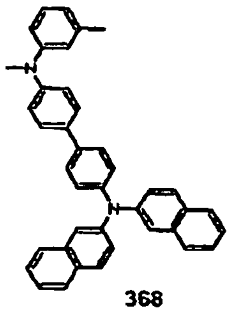
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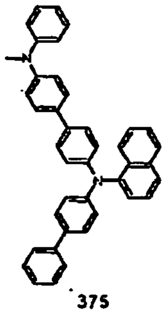
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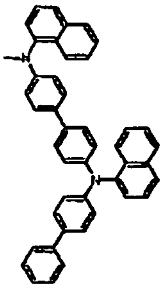
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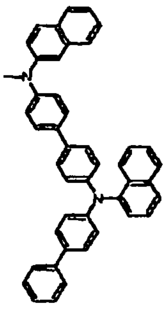
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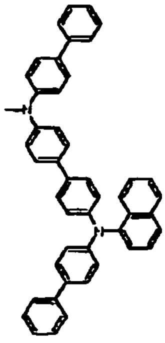
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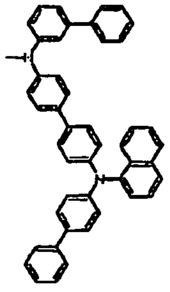
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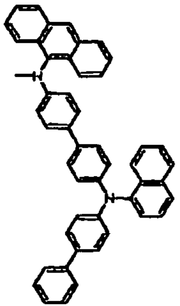
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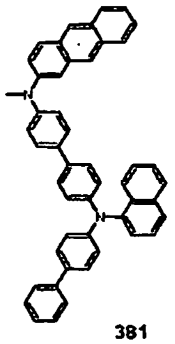
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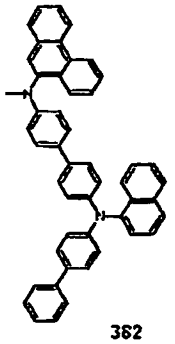
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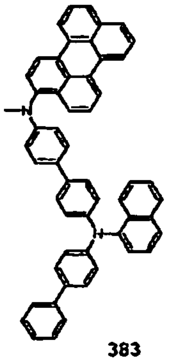
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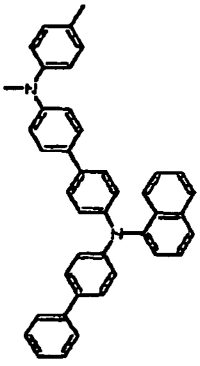
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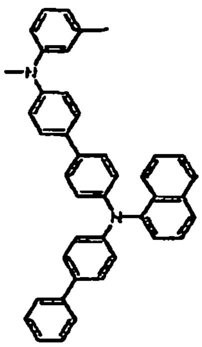
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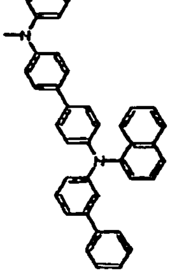
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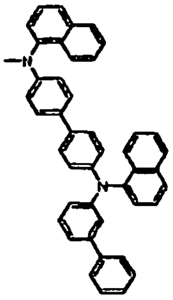
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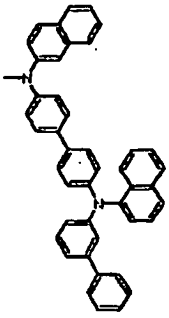
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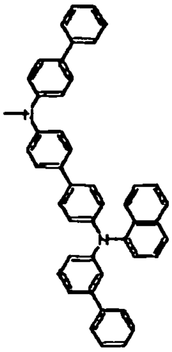
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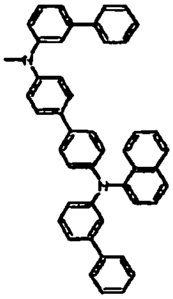
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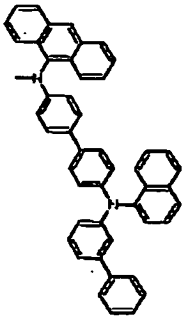
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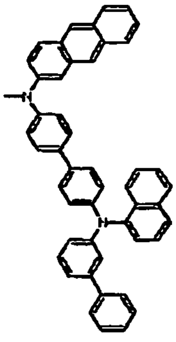
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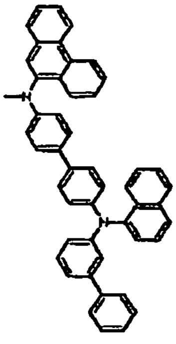
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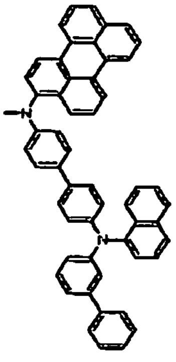
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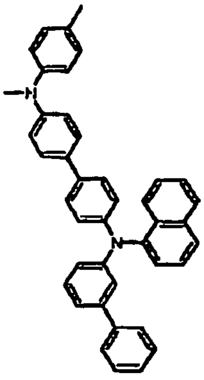
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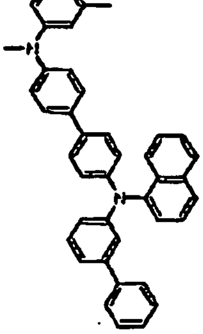
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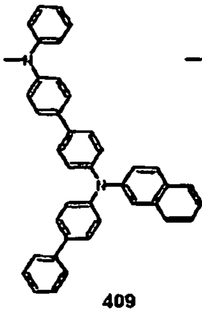
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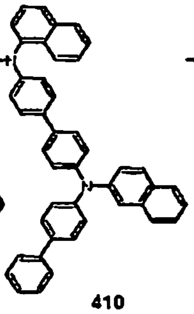
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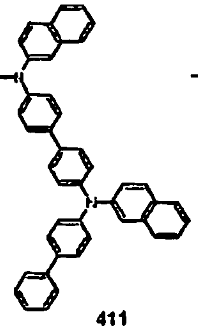
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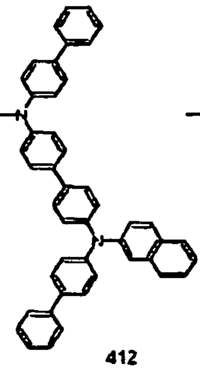
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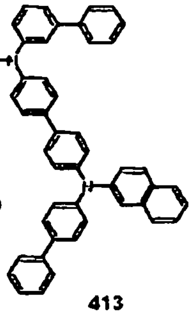
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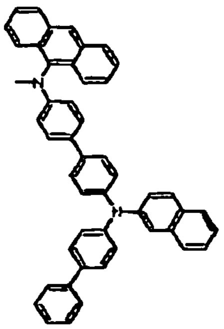
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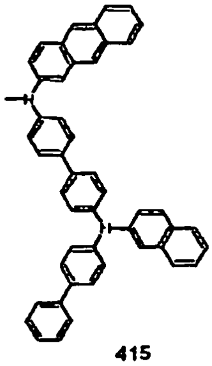
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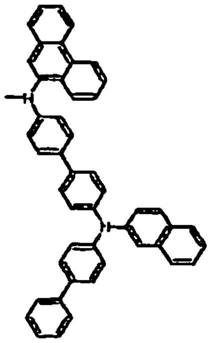
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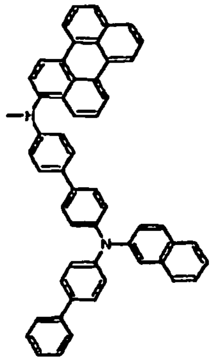
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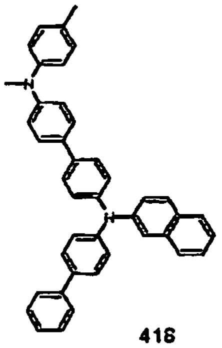
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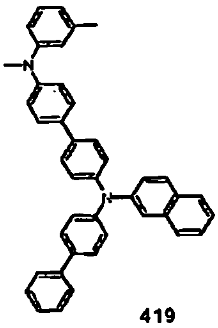
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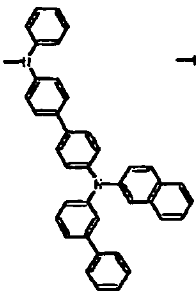
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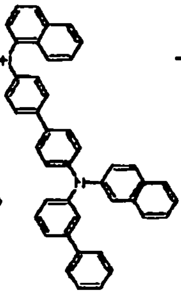
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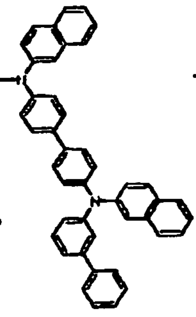
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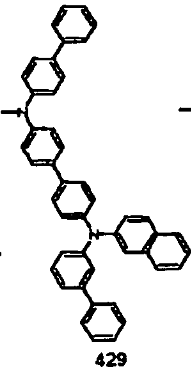
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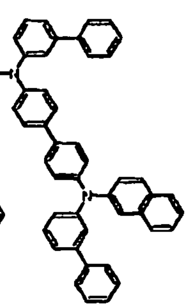
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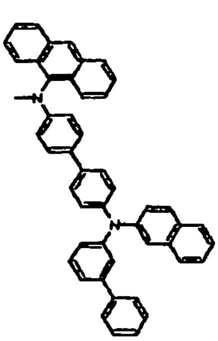
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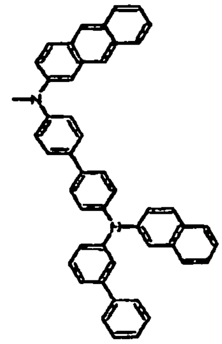
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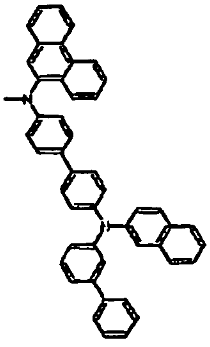
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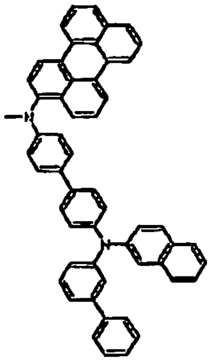
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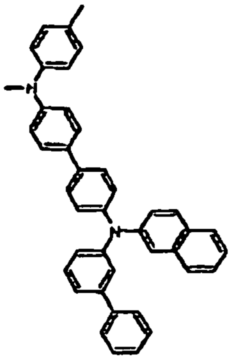
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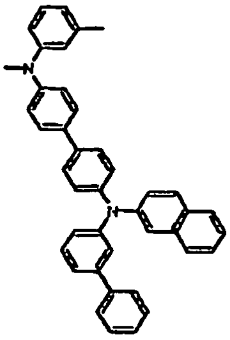
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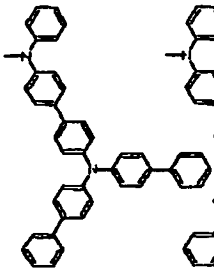
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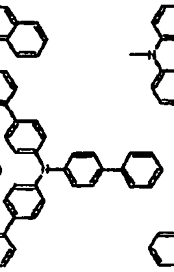
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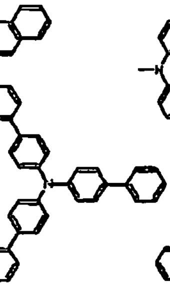
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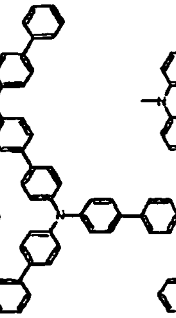
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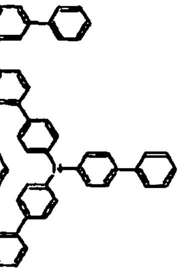
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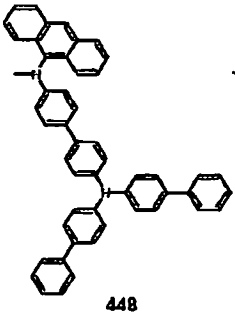
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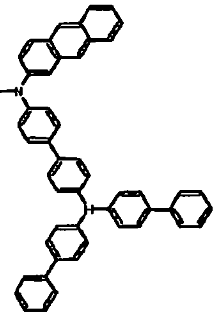
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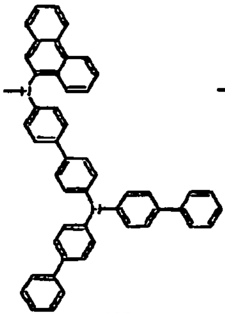
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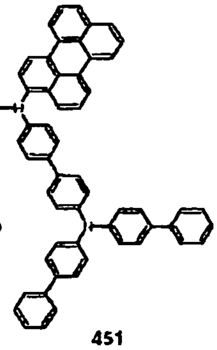
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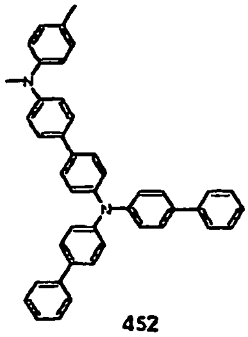

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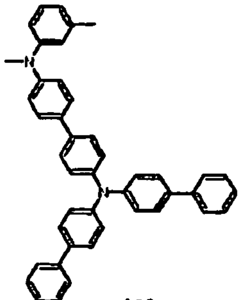

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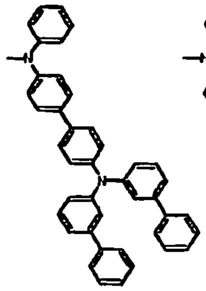

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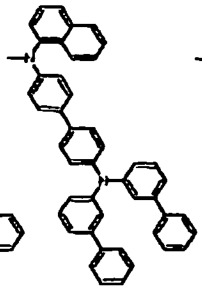

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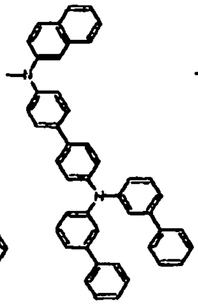

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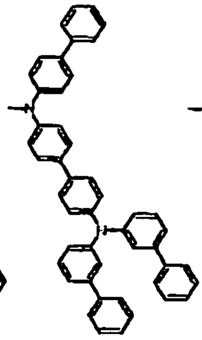

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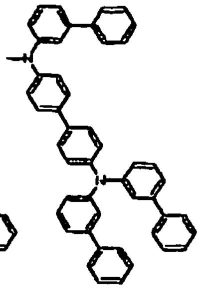

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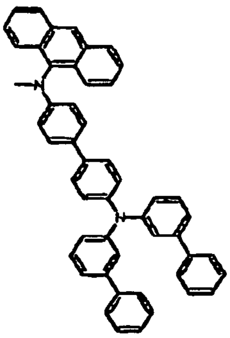

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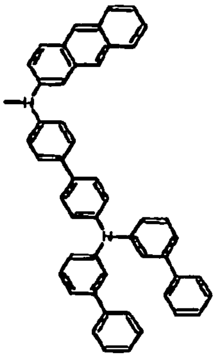

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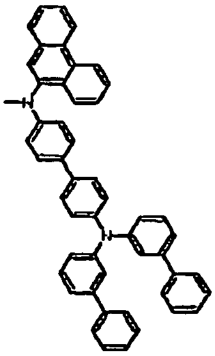

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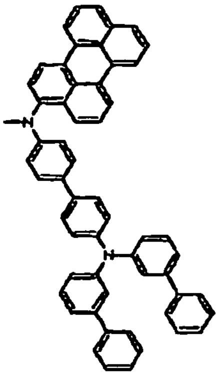

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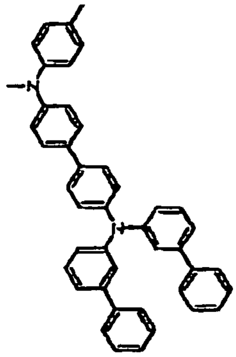

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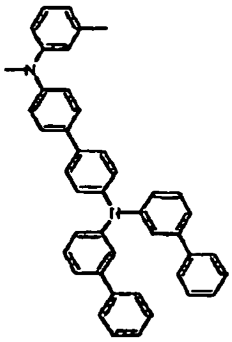

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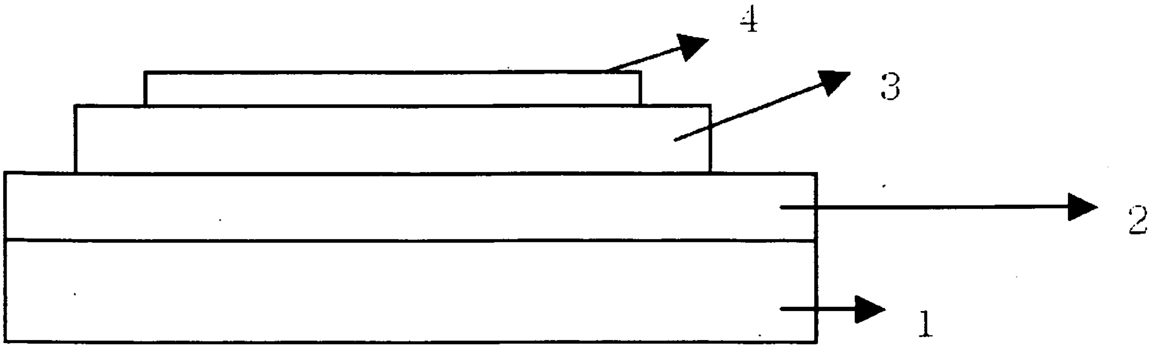
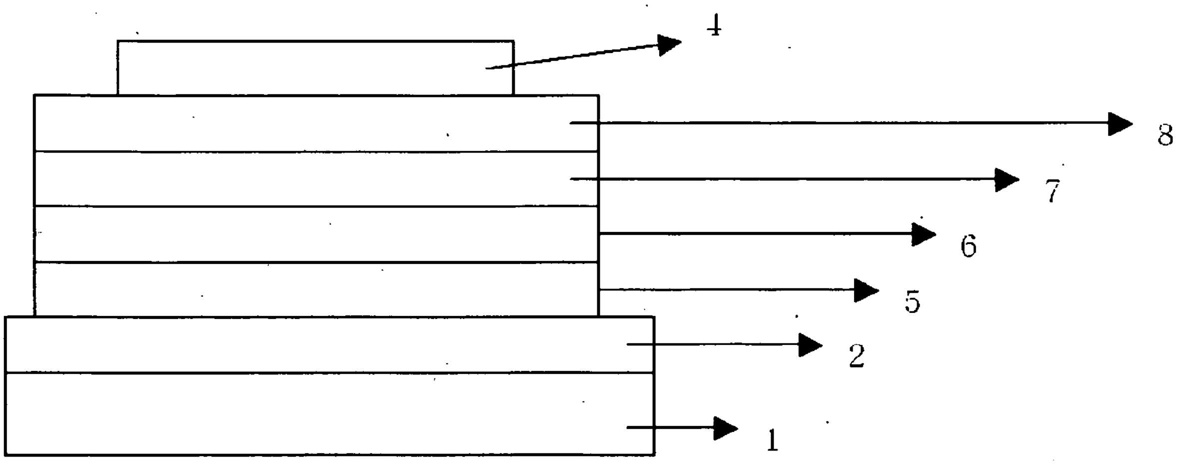
[Fig. 1]



[Fig. 2]



REFERENCES CITED IN THE DESCRIPTION

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- WO 2004020371 A **[0007]**
- US 20040219386 A **[0007]**
- US 20030044518 A **[0019]**
- EP 1146574 A2 **[0019]**

专利名称(译)	新型化合物及使用其的有机发光装置（8）		
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申请号	EP2005856364	申请日	2005-09-23
[标]申请(专利权)人(译)	乐金化学股份有限公司		
申请(专利权)人(译)	LG化学有限公司.		
当前申请(专利权)人(译)	LG化学有限公司.		
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发明人	CHO, WOOK DONG, 107-1006 EXPO APT., 15/3 464-1 KIM, JI EUN, 7-403 LG CHEMISTRY APT., 381-42 JEON, BYUNG SUN JEONG, DONG SEOB YOON, SEOK HEE, 302-904 SONGGANG GREEN APT. MOON, JAE MIN, 3-507 LG CHEMISTRY DORMITORY		
IPC分类号	C09K11/06		
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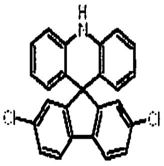
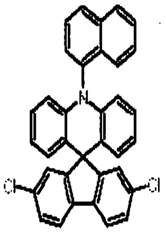
优先权	1020040077214 2004-09-24 KR		
其他公开文献	EP1794260A4 EP1794260A1		
外部链接	Espacenet		

摘要(译)

公开了一种有机发光器件。 有机发光器件包括第一电极，包括发光层的有机材料层和第二电极。 第一电极，有机材料层和第二电极形成层状结构，并且有机材料层的至少一层包括其中热固性或光致的式1的化合物或式1的化合物 -介绍了可交联的官能团。



[Formula a]



[Formula b]