(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 444 804 A3**

(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
30.04.2014 Bulletin 2014/18

(43) Date of publication A2:
25.04.2012 Bulletin 2012/17

(21) Application number: **11008035.5**

(22) Date of filing: **28.05.2007**

(51) Int Cl.:
G01N 33/53 *(2006.01)* ***C08F 8/42*** *(2006.01)*
C08F 220/36 *(2006.01)*

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK RS

(30) Priority: **27.05.2006 US 803356 P**

(62) Document number(s) of the earlier application(s) in accordance with Art. 76 EPC:
07719866.1 / 2 021 793

(71) Applicants:
- **Winnik, Mitchell A.**
  Toronto,
  Ontario M6P 1G8 (CA)
- **Nitz, Mark**
  Toronto, Ontario M5V 3L5 (CA)
- **Baranov, Vladimir I.**
  Richmond Hill ON L4S 1Z5 (CA)
- **Lou, Xudong**
  Richmond Hill, Ontario L4B 4P4 (CA)

(72) Inventors:
- **Winnik, Mitchell A.**
  Toronto,
  Ontario M6P 1G8 (CA)
- **Nitz, Mark**
  Toronto, Ontario M5V 3L5 (CA)
- **Baranov, Vladimir I.**
  Richmond Hill ON L4S 1Z5 (CA)
- **Lou, Xudong**
  Richmond Hill, Ontario L4B 4P4 (CA)

(74) Representative: **Vossius & Partner**
Siebertstrasse 4
81675 München (DE)

(54) **Polymer backbone element tags**

(57) Element tags based on novel metal-polymer conjugates are provided for elemental analysis of analytes, including ICP-MS. A polymer backbone is functionalized to irreversibly bind metals that are selected prior to use by the user. The polymer is further functionalized to attach a linker which allows for attachment to antibodies or other affinity reagents. The polymer format allows attachment of many copies of a given isotope, which linearly improves sensitivity. The metal-polymer conjugate tags enable multiplexed assay in two formats : bulk assay, where the average biomarker distribution in the sample is diagnostic, and single cell format to distinguish a rare (for example a diseased) cell in a complex sample (for example, blood).

EP 2 444 804 A3

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 11 00 8035

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,D	BARANOV V I ET AL: "A SENSITIVE AND QUANTITATIVE ELEMENT-TAGGED IMMUNOASSAY WITH ICPMS DETECTION", ANALYTICAL CHEMISTRY, AMERICAN CHEMICAL SOCIETY, US, vol. 74, no. 7, 1 April 2002 (2002-04-01), pages 1629-1636, XP001115851, ISSN: 0003-2700, DOI: 10.1021/AC0110350 * EXPERIMENTAL SECTION */RESULTS AND DISCUSSION *; page 1630, left-hand column - page 1635, right-hand column -----	1-15	INV. G01N33/53 C08F8/42 C08F220/36
A,D	US 2004/072250 A1 (BARANOV VLADIMIR [CA] ET AL) 15 April 2004 (2004-04-15) * examples * -----	1-15	
A,D	US 2005/218319 A1 (BANDURA DMITRY R [CA] ET AL) 6 October 2005 (2005-10-06) * figures; examples * -----	1,10,11	
A	ORNATSKY O ET AL: "Multiple cellular antigen detection by ICP-MS", JOURNAL OF IMMUNOLOGICAL METHODS, ELSEVIER SCIENCE PUBLISHERS B.V.,AMSTERDAM, NL, vol. 308, no. 1-2, 20 January 2006 (2006-01-20), pages 68-76, XP028017415, ISSN: 0022-1759, DOI: 10.1016/J.JIM.2005.09.020 [retrieved on 2006-01-20] * the whole document * * page 74, right-hand column, lines 19-23 * -----	1-15	TECHNICAL FIELDS SEARCHED (IPC) G01N C08F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	13 March 2014	Hutton, David

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 11 00 8035

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

13-03-2014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2004072250 A1	15-04-2004	US 2004072250 A1	15-04-2004
		US 2008176334 A1	24-07-2008
		WO 2005003767 A2	13-01-2005
US 2005218319 A1	06-10-2005	CA 2561007 A1	06-10-2005
		EP 1733415 A1	20-12-2006
		JP 4982635 B2	25-07-2012
		JP 2007530924 A	01-11-2007
		US 2005218319 A1	06-10-2005
		US 2009134326 A1	28-05-2009
		US 2012056086 A1	08-03-2012
		US 2012126114 A1	24-05-2012
		WO 2005093784 A1	06-10-2005

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

专利名称(译)	聚合物骨架元素标签		
公开(公告)号	EP2444804A3	公开(公告)日	2014-04-30
申请号	EP2011008035	申请日	2007-05-28
[标]申请(专利权)人(译)	WINNIK米切尔 NITZ MARK 巴拉诺夫VLADIMIR我 楼旭东		
申请(专利权)人(译)	WINNIK，MITCHELL A. NITZ，MARK 巴拉诺夫，VLADIMIR I. 楼旭东		
当前申请(专利权)人(译)	WINNIK，MITCHELL A. NITZ，MARK 巴拉诺夫，VLADIMIR I. 楼旭东		
[标]发明人	WINNIK MITCHELL A NITZ MARK BARANOV VLADIMIR I LOU XUDONG		
发明人	WINNIK, MITCHELL A. NITZ, MARK BARANOV, VLADIMIR I. LOU, XUDONG		
IPC分类号	G01N33/53 C08F8/42 C08F220/36		
CPC分类号	C08F8/42 C08F220/36 G01N33/532 G01N33/58 Y10T436/24 C08F8/14 C08F8/32 C08F220/56 G01N33/57426		
代理机构(译)	法思博事务所		
审查员(译)	赫顿DAVID		
优先权	60/803356 2006-05-27 US		
其他公开文献	EP2444804B1 EP2444804A2		
外部链接	Espacenet		

摘要(译)

基于新型金属 - 聚合物缀合物的元件标签被提供用于分析物的元素分析，包括ICP-MS。聚合物主链被官能化以不可逆地结合在使用者使用之前选择的金属。进一步官能化聚合物以连接接头，该接头允许连接抗体或其他亲和试剂。聚合物形式允许附着给定同位素的许多拷贝，其线性地改善灵敏度。金属 - 聚合物缀合物标签能够以两种形式进行多重测定：批量测定，其中样品中的平均生物标记物分布是诊断性的，以及单细胞形式以区分复杂样品中的稀有（例如患病）细胞（例如，血液）。

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 11 00 8035

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,D	BARANOV V I ET AL: "A SENSITIVE AND QUANTITATIVE ELEMENT-TAGGED IMMUNOASSAY WITH ICPMS DETECTION", ANALYTICAL CHEMISTRY, AMERICAN CHEMICAL SOCIETY, US, vol. 74, no. 7, 1 April 2002 (2002-04-01), pages 1629-1636, XP001115851, ISSN: 0003-2700, DOI: 10.1021/AC0110350 * EXPERIMENTAL SECTION */RESULTS AND DISCUSSION *; page 1630, left-hand column - page 1635, right-hand column -----	1-15	INV. G01N33/53 C08F8/42 C08F220/36
A,D	US 2004/072250 A1 (BARANOV VLADIMIR [CA] ET AL) 15 April 2004 (2004-04-15) * examples * -----	1-15	
A,D	US 2005/218319 A1 (BANDURA DMITRY R [CA] ET AL) 6 October 2005 (2005-10-06) * figures; examples * -----	1,10,11	
A	ORNATSKY O ET AL: "Multiple cellular antigen detection by ICP-MS", JOURNAL OF IMMUNOLOGICAL METHODS, ELSEVIER SCIENCE PUBLISHERS B.V.,AMSTERDAM, NL, vol. 308, no. 1-2, 20 January 2006 (2006-01-20), pages 68-76, XP028017415 ISSN: 0022-1759, DOI: 10.1016/J.JIM.2005.09.020 [retrieved on 2006-01-20] * the whole document * * page 74, right-hand column, lines 19-23 * -----	1-15	TECHNICAL FIELDS SEARCHED (IPC) G01N C08F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	13 March 2014	Hutton, David

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)