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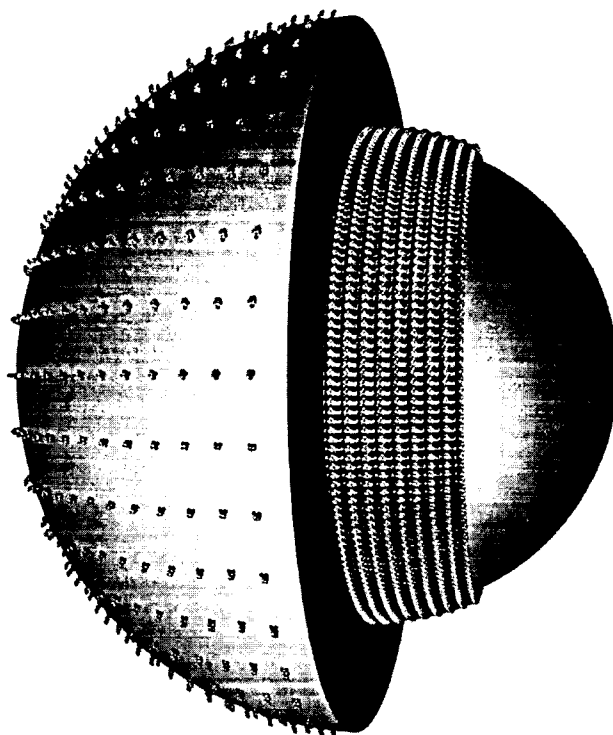
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[Continued on next page]

(54) Title: COMPOUNDS AND MARKERS FOR SURFACE-ENHANCED RAMAN SCATTERING

Figure 6



(57) Abstract: The present invention relates to compounds and markers for surface-enhanced Raman scattering (SERS), and methods for the preparation of the SERS markers. The present invention further relates to compositions, methods and uses, wherein the present SERS markers are employed.

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FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL,  
NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG,  
CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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**INTERNATIONAL SEARCH REPORT**

International application No  
**PCT/EP2008/008098**

**A. CLASSIFICATION OF SUBJECT MATTER**  
INV. G01N33/532 G01N33/58 G01N21/65

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
**G01N**

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**EPO-Internal, EMBASE, BIOSIS, WPI Data**

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	YU KYEONG N Y ET AL: "Multiplex targeting, tracking, and imaging of apoptosis by fluorescent surface enhanced raman spectroscopic dots" BIOCONJUGATE CHEMISTRY 2007 UNITED STATES, vol. 18, no. 4, 6 September 2007 (2007-09-06), pages 1155-1162, XP002467126 ISSN: 1043-1802 cited in the application	1-52
X	page 1156, figure 1 page 1160, right-hand column, paragraph 1; figure 5	1-6, 14, 15, 20-31, 35, 36, 40, 42-52
Y	abstract page 1155, right-hand column, paragraph 2  the whole document	7-13, 37-39

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Further documents are listed in the continuation of Box C.

See patent family annex.

\* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*&\* document member of the same patent family

Date of the actual completion of the international search

**11 May 2009**

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**Mulder, Lonneke**

## INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2008/008098

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	<p>-----</p> <p>GRUBISHA D S ET AL: "FEMTOMOLAR DETECTION OF PROSTATE-SPECIFIC ANTIGEN: AN IMMUNOASSAY BASED ON SURFACE-ENHANCED RAMAN SCATTERING AND IMMUNOGOLD LABELS" ANALYTICAL CHEMISTRY, AMERICAN CHEMICAL SOCIETY. COLUMBUS, US, vol. 75, no. 21, 1 November 2003 (2003-11-01), pages 5936-5943, XP001047339 ISSN: 0003-2700 cited in the application</p>	16, 41
Y	Schemes 2b, 3; Experimental section	17-34, 42
Y	<p>-----</p> <p>SUNG KIE-MOON ET AL: "Synthesis of monofunctionalized gold nanoparticles by Fmoc solid-phase reactions" JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, vol. 126, no. 16, 28 April 2004 (2004-04-28), pages 5064-5065, XP002467127 ISSN: 0002-7863</p>	16, 41
Y	page 5064, last sentence of the first paragraph scheme 1, p.5064 left-hand column, reference 1	17-34, 42-52
A	<p>-----</p> <p>S. SCHLÜCKER, B. KÜSTNER, A. PUNGE, R. BONFIG, A. MARX, P. STRÖBEL: "Immuno-Raman microspectroscopy: In situ detection of antigens in tissue specimens by surface-enhanced Raman scattering" JOURNAL OF RAMAN SPECTROSCOPY, vol. 37, 2006, pages 719-721, XP002467128 cited in the application</p>	1-52
Y	section 'Experimental' and Reference 3 abstract; figures 1,2	17-34, 42-52
A	<p>-----</p> <p>KRIEGISCH VOLKER ET AL: "Self-Assembled Monolayers of Chromophores on Gold Surfaces" TOPICS IN CURRENT CHEMISTRY, SPRINGER, BERLIN, DE, vol. 258, 2005, pages 257-313, XP008088050 ISSN: 0340-1022</p>	16, 41
Y	page 266 - page 267; figures 8,9	17-34, 42
A	<p>-----</p> <p>US 2005/089901 A1 (PORTER MARC D [US] ET AL) 28 April 2005 (2005-04-28) cited in the application</p>	1-52
Y	paragraphs [0017], [0058]; claims 1-12; figures 1,7b,8; example 3	17-34, 42-52
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## INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2008/008098

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 10 2006 000775 A1 (JULIUS MAXIMILIANS UNI WUERZBU [DE])	1-52
Y	12 July 2007 (2007-07-12) paragraphs [0019], [0020], [0028] - [0045]; figures 4-6	17-34, 42-52
A	----- SIMARD, BRIGGS, BOAL, ROTELLO: "Formation and pH-controlled assembly of amphiphilic gold nanoparticles" CHEM COMMUN, 2000, pages 1943-1944, XP002467129 scheme 1 page 1943	1-52
A	----- BOAL A K ET AL: "Fabrication and self-optimization of multivalent receptors on nanoparticle scaffolds [12]" JOURNAL OF THE AMERICAN CHEMICAL SOCIETY 02 FEB 2000 UNITED STATES, vol. 122, no. 4, 2 February 2000 (2000-02-02), pages 734-735, XP002468350 ISSN: 0002-7863 page 734	1-52
X	----- KIM JONG-HO ET AL: "Nanoparticle probes with surface enhanced Raman spectroscopic tags for cellular cancer targeting." ANALYTICAL CHEMISTRY 1 OCT 2006, vol. 78, no. 19, 1 October 2006 (2006-10-01), pages 6967-6973, XP002476647 ISSN: 0003-2700 cited in the application page 6968-6969 'Experimental Section'; figure 1; page 6973 first paragraph abstract; figure 6 the whole document	1-6, 14, 15, 20-31, 35, 36, 40, 42-52
X	----- JUN BONG-HYUN ET AL: "Surface-enhanced Raman spectroscopic-encoded beads for multiplex immunoassay." JOURNAL OF COMBINATORIAL CHEMISTRY 2007 MAR-APR, vol. 9, no. 2, March 2007 (2007-03), pages 237-244, XP002476648 ISSN: 1520-4766 cited in the application page 238-239 'Experimental Section'; figure 1 the whole document	1-6, 14, 15, 20-31, 35, 36, 40, 42, 49-52
Y	----- US 2007/048797 A1 (SU XING [US]) 1 March 2007 (2007-03-01) paragraph [0026] - paragraph [0032]	7-13, 37-39
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INTERNATIONAL SEARCH REPORT

International application No  
PCT/EP2008/008098

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>MCCABE AILIE F ET AL: "SERRS LABELLED BEADS FOR MULTIPLEX DETECTION". FARADAY DISCUSSIONS, ROYAL SOCIETY OF CHEMISTRY, CAMBRIDGE, GB, vol. 132, 2006, pages 303-308, DISCUS, XP001248934 ISSN: 0301-7249 cited in the application figure 1 page 305, paragraph 2 page 303, last paragraph -----</p>	<p>7-13, 37-39</p>

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/EP2008/008098

## Box No. II Observations where certain claims were found unsearchable (Continuation of Item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
  
3.  Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1.  As all required additional search fees were timely paid by the applicant, this international search report covers allsearchable claims.
2.  As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3.  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4.  No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

### Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-16, 35-41 complete; claims 20-31, 42-52 partial

A SERS marker, and preparation and use of the SERS marker, comprising a SAM comprising a Raman dye, coupled to metal particles.

The SERS marker further comprises an encapsulant.

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2. claims: 17-19, 32-34 complete; claims 20-31, 42-52 partial

A SERS marker, and preparation and use of the SERS marker, comprising a SAM comprising a Raman dye (Ra), coupled to metal particles.

The SERS marker further comprises a linear spacer of at least 3 atoms coupled to Ra.

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2008/008098

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2005089901 A1	28-04-2005	NONE	
DE 102006000775 A1	12-07-2007	NONE	
US 2007048797 A1	01-03-2007	NONE	