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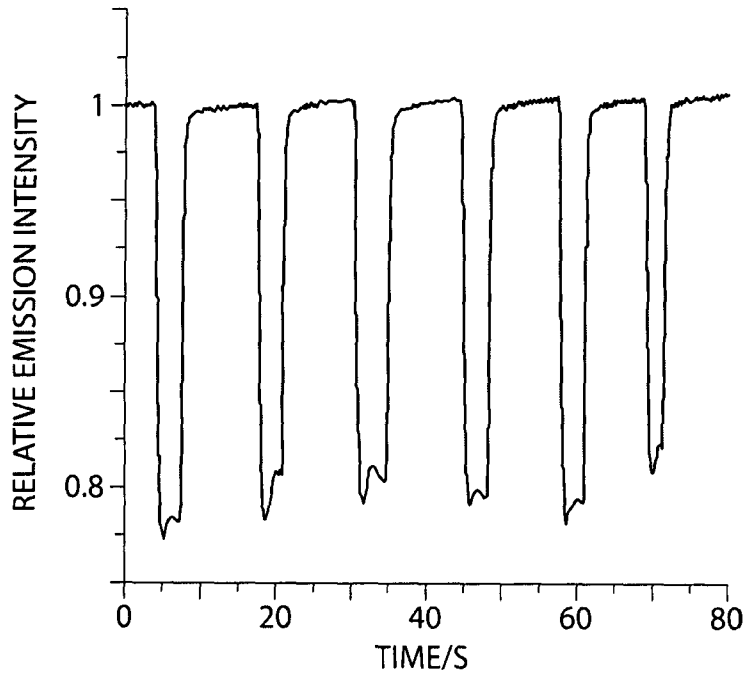
(54) Title: DETECTION OF EXPLOSIVES, TOXINS AND OTHER COMPOSITIONS



(57) Abstract: The present invention generally relates to methods for modulating the optical properties of a luminescent polymer via interaction with a species (e.g., an analyte). In some cases, the present invention provides methods for determination of an analyte by monitoring a change in an optical signal of a luminescent polymer upon exposure to an analyte. Methods of the present invention may be useful for the vapor phase detection of analytes such as explosives and toxins. The present invention also provides methods for increasing the luminescence intensity of a polymer, such as a polymer that has been photobleached, by exposing the luminescent polymer to a species such as a reducing agent.

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INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
INV. G01N21/64 G01N21/77

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, WPI Data, CHEM ABS Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	THOMAS SAMUEL W 3RD ET AL: "Amplifying fluorescent polymer sensors for the explosives taggant 2,3-dimethyl-2,3-dinitrobutane (DMNB)." CHEMICAL COMMUNICATIONS (CAMBRIDGE, ENGLAND) 28 SEP 2005, no. 36, 28 September 2005 (2005-09-28), pages 4572-4574, XP002462280 ISSN: 1359-7345 page 4573; figure 1 ----- -/--	1-5,9-20

[X] Further documents are listed in the continuation of Box C.

[X] 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	Date of mailing of the international search report
13 December 2007	08/04/2008

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Michalitsch, Richard

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2007/017380

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	THOMAS, S.; SWAGER, T.: "Designing Amplifying Polymer Sensors for Explosives and Toxic Chemicals" POLYMERIC MATERIALS: SCIENCE AND ENGINEERING, vol. 95, September 2006 (2006-09), pages 81-82, XP009093648 the whole document	1,5,9-20
Y	US 2006/120917 A1 (SWAGER TIMOTHY M [US] ET AL) 8 June 2006 (2006-06-08) figures 5,6 figures 14a-g paragraphs [0010] - [0022] paragraph [0118]	1-5,9-12
Y	US 5 157 261 A (GREY ALAN E [US] ET AL) 20 October 1992 (1992-10-20) abstract column 2, lines 27-67 column 4, lines 26-48	1-5,9-12
Y	US 2005/226775 A1 (AKER CRAIG A [US] ET AL) 13 October 2005 (2005-10-13) abstract figures 1a,b paragraphs [0013] - [0015]	1-5,9-12

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2007/017380

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 all searchable 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.:

see annex

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(in part),2-5,9-24

   A method of determination of DMNB comprising exposing the sample to a luminescent polymer having a triazole or pendant triazole group.

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2. claims: 1(in part),6-8

   A method of determination of DMNB comprising exposing the sample to a luminescent polymer and treating the DMNB to produce a nitrite ion, which is determined.

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3. claims: 25-65

   A method of determination of hydrazine or hydrazine derivatives comprising exposing the sample to a luminescent polymer.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2007/017380

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2006120917 A1	08-06-2006	US 2006120923 A1 US 2007081921 A1	08-06-2006 12-04-2007
US 5157261 A	20-10-1992	NONE	
US 2005226775 A1	13-10-2005	NONE	