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Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))
- of inventorship (Rule 4.17(iv))

Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(88) Date of publication of the international search report:
22 April 2010

(54) Title: PRO-FLUORESCENT PROBES

(57) Abstract: The present invention provides a novel class of pro-fluorescent probes for reactive oxygen species (ROS). One exemplary probe is mitochondria peroxy yellow 1 (MitoPY1), a new type of fluorophore for imaging mitochondrial H₂O₂ in living cells with ROS and spatial specificity. The invention also provides methods of using pro-fluorescent probes to detect analytes. One exemplary method comprises using a pro-fluorescent probe of the invention to detect an explosive.



WO 2009/152102 A3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2009/046637**A. CLASSIFICATION OF SUBJECT MATTER****C09K 11/06(2006.01)i**

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)

C09K 11/06; C07C 37/00; C07D 209/54; C07D 221/20; C07D 413/14; C09B 11/00; C12Q 1/68

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

(Chinese Patents and application for patent)

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

eKOMPASS(KIPO internal) & Keywords: fluorescent, fluorogenic

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2007-050810 A2 (THE REGENTS OF THE UNIVERSITY OF CALIFORNIA et al.) 03 May 2007	1, 12, 13, 33-35, 40-42
A	See entire document, especially paragraphs Formulas (I)-(VII); Claims 1-22	2-11, 19, 36
A	US 5227487 A1 (HAUGLAND; RICHARD P. et al.) 13 July 1993 See claims 1, 8, 9, 13	1-13, 19, 33-36, 40-42
A	US 2005-0214807 A1 (IAIN JOHNSON et al.) 29 September 2005 See compounds 5, 6	1-13, 19, 33-36, 40-42
A	WO 97-39064 A1 (MOLECULAR PROBES, INC.) 23 October 1997 See Tables 6-8	1-13, 19, 33-36, 40-42

☐ 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 application or patent 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 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

25 FEBRUARY 2010 (25.02.2010)

Date of mailing of the international search report

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Name and mailing address of the ISA/KR

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2009/046637**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.: 15, 18, 21, 22, 24, 27, 29, and 32
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:

The subject matter of claims 15, 18, 21, 22, 24, 27, 29, and 32 is not considered to be clear, since the claims 15, 18, 21, 22, 24, 27, 29, and 32 are referring to one of the claims 14, 16, 20, 23, 26, 28, and 31 respectively, which are not drafted in accordance with the second and the third sentences of Rule 6.4(a).
3. ☒ Claims Nos.: 14, 16, 17, 20, 23, 25, 26, 28, 30, 31, 37-39, and 43
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:

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 fee, this Authority did not invite payment of any additional fee.
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.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2009/046637

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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