

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
19 June 2008 (19.06.2008)

PCT

(10) International Publication Number
WO 2008/073261 A3

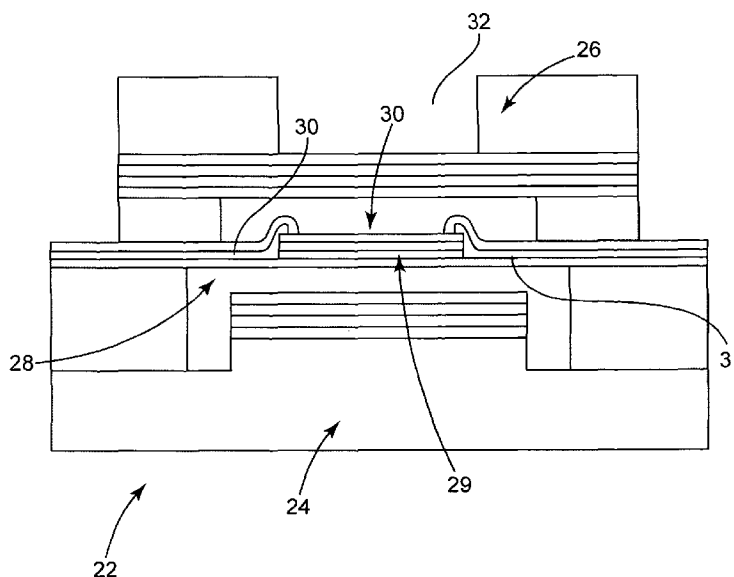
- (51) International Patent Classification:
G01J 5/00 (2006.01)
- (21) International Application Number:
PCT/US2007/024956
- (22) International Filing Date:
6 December 2007 (06.12.2007)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/873,650 8 December 2006 (08.12.2006) US
- (71) Applicant (for all designated States except US): **RE-
GENTS OF THE UNIVERSITY OF MINNESOTA**
[US/US]; Office for Technology Commercialization,
1000 Westgate Drive, Suite 160, St. Paul, Minnesota
55114-8658 (US).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): **TALGHADER,
Joseph, J.** [US/US]; 200 Union Street, Minneapolis,
Minnesota 55455 (US).

- (74) Agents: **HUBBARD, Kevin, J.** et al.; Kagan Binder, PLLc,
Suite 200, Maple Island Building, 221 Main Street North,
Stillwater, Minnesota 55082 (US).
- (81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH,
CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG,
ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL,
IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK,
LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW,
MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL,
PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY,
TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA,
ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL,
PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— with international search report

[Continued on next page]

(54) Title: DETECTION BEYOND THE STANDARD RADIATION NOISE LIMIT USING REDUCED EMISSIVITY AND OPTICAL CAVITY COUPLING



(57) Abstract: The present invention provides thermal detectors having an optical cavity that is optimized to couple light into a sensor. Light that is on resonance is coupled with the sensor with as high as 100% efficiency, while light off resonance is substantially reflected away. Light that strikes the sensor from the sides (i.e. not on the optical cavity axis) only interacts minimally with sensor because of the reduced absorption characteristics of the sensor. Narrowband sensors in accordance with the present invention can gain as much as 100% of the signal from one direction and spectral band, while receiving only a fraction of the normal radiation noise, which originates from all spectral bands and directions.

WO 2008/073261 A3



(88) Date of publication of the international search report:
28 August 2008

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2007/024956

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - G01J 5/00 (2008.04)

USPC - 250/338.1

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)

IPC(8) - G01J 5/00 (2008.04)

USPC - 250/338.1

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 practicable, search terms used)

MicroPatent

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2006/0091284 A1 (VIENS et al) 04 May 2006 (04.05.2006) entire document	1-25
Y	US 6,534,977 B1 (DUNCAN et al) 18 March 2003 (18.03.2003) entire document	1-25
Y	US 5,688,699 A (CUNNINGHAM et al) 18 November 1997 (18.11.1997) entire document	1-18
Y	US 6,900,440 B2 (REED et al) 31 May 2005 (31.05.2005) entire document	5, 19-25
Y	US 2006/0039009 A1 (KIESEL et al) 23 February 2006 (23.02.2006) entire document	2
Y	JP2005156255 A (HISHINUMA KUNIYUKI) 16 June 2005 (16.06.2005) abstract	17-18
A	WO 01/81879 A2 (GOOCH et al) 01 November 2001 (01.11.2001) entire document	1-25
A	WO 2005/003704 A1 (COMBES et al) 13 January 2005 (13.01.2005) entire document	1-25

 Further documents are listed in the continuation of Box C.

* 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 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

29 April 2008

Date of mailing of the international search report:

27 MAY 2008

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450

Facsimile No. 571-273-3201

Authorized officer:

Blaine R. Copenheaver

PCT Helpdesk: 571-272-4300
PCT OSP: 571-272-7774