

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
18 October 2001 (18.10.2001)

PCT

(10) International Publication Number
WO 01/78288 A3

- (51) International Patent Classification⁷: C30B 28/12, 29/46, H01L 29/06, H01J 1/02, C22C 21/00, C22B 43/00
- (74) Agents: BARRISH, Mark, D. et al.; Townsend and Townsend and Crew LLP, Two Embarcadero Center, 8th Floor, San Francisco, CA 94111 (US).
- (21) International Application Number: PCT/US01/11251
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (22) International Filing Date: 6 April 2001 (06.04.2001)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 60/195,520 6 April 2000 (06.04.2000) US
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- (71) Applicant (*for all designated States except US*): QUANTUM DOT CORPORATION [US/US]; 26136 Research Road, Hayward, CA 94545 (US).
- Published:
— with international search report
- (72) Inventors; and
- (88) Date of publication of the international search report: 28 March 2002
- (75) Inventors/Applicants (*for US only*): EMPEDOCLES, Stephen, A. [US/US]; 2507 Mardell Way, Mountain View, CA 94043 (US). TREADWAY, Joseph, A. [US/US]; 34736 Bowie Common, Fremont, CA 94555 (US). WATSON, Andrew, R. [GB/US]; 1 Spring Lane, Belmont, CA 94002 (US).
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*



WO 01/78288 A3

(54) Title: DIFFERENTIABLE SPECTRAL BAR CODE METHODS AND SYSTEMS

(57) Abstract: Devices, systems, methods (as depicted in figure 1a), and compositions of matter can track and/or identify a library of elements, particularly for use with fluids, particulates, cells, and the like. Signals from one or more semiconductor nanocrystals may be combined to define spectral codes. Separation of signal wavelengths within dedicated wavelength ranges or windows facilitates differentiation of spectral codes, while calibration signals within the spectral codes can avoid ambiguity. Modeling based on prior testing can help derive libraries of acceptable codes.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/11251

<p>A. CLASSIFICATION OF SUBJECT MATTER IPC(7) :C30B 28/12, 29/46; H01L 29/06; H01J 1/02; C22C 21/00; C22B 43/00 US CL :Please See Extra Sheet. According to International Patent Classification (IPC) or to both national classification and IPC</p>		
<p>B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : Please See Extra Sheet.</p>		
<p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched</p>		
<p>Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) STN EXPRESS, CAS ONLINE, CAOLD, CAPLUS, MEDLINE, BEILSTEIN, MARPAT AND U.S. PATENT OFFICE DATABASES; WEST AND EAST</p>		
<p>C. DOCUMENTS CONSIDERED TO BE RELEVANT</p>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	ALIVISATOS, Perspectives on the Physical Chemistry of Semiconductor Nanocrystals. 1996, Phys. Chem., Vol. 100, pages 13226-13239.	1-82
X	DANEK. M. et al., Synthesis of Luminescent Thin-Film CdSe/ZnSe Quantum Dot Composites Using CdSe Quantum Dots Passivated with an Ovelayer of ZnSe. Chemistry of Materials, 1996, Vol. 8, pages 173-180.	1-82
X	DABBOUS I. et al. (CdSe)ZnS Core-Shell Quantum Dots: Synthesis and Characterization of a Size of a Series of Highly Luminescent Nanocrystallites, November 1997, J. Phys Chem., 101, pages 9463-9475.	1-82
<p><input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.</p>		
* Special categories of cited documents:	"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
"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"E" earlier document published on or after the international filing date	"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
"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)	"Z"	document member of the same patent family
"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		
Date of the actual completion of the international search 28 JUNE 2001	Date of mailing of the international search report 17 DEC 2001	
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer <i>Grace C. Hsu</i> GRACE C. HSU, PH.D. Telephone No. (703) 308-0196	

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/11251

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,990,479 A (WEISS et al.) 23 NOVEMBER 1999, See entire document.	1-82
X	US 5,537,000 A (ALIVISATOS et al.) 16 JULY 1996, See entire document.	1-82
X	US 5,751,018 A (ALIVISATOS et al.) 12 MAY 1998, See entire document.	1-82

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/11251

A. CLASSIFICATION OF SUBJECT MATTER:

US CL :

117/108, 956; 257/17, 18, 19, 21, 22, 40, 64, 185, 200, 642, 642.64; 313/33.4, 225, 228, 233; 420/528, 555, 576, 579 ;
423/289, 290, 299; 437/105, 106, 110, 127, 131, 225, 228, 233, 234, 905

B. FIELDS SEARCHED

Minimum documentation searched

Classification System: U.S.

117/108, 956; 257/17, 18, 19, 21, 22, 40, 64, 185, 200, 642, 642.64; 313/33.4, 225, 228, 233; 420/528, 555, 576, 579 ;
423/289, 290, 299; 437/105, 106, 110, 127, 131, 225, 228, 233, 234, 905