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(71) Applicant: **THE REGENTS OF THE UNIVERSITY OF CALIFORNIA** [US/US]; Los Alamos National Laboratory, LC/IP, MS A187, Los Alamos, NM 87545 (US).

(72) Inventors: **DATTELBAUM, Andrew, M.**; 4720 Urban Street, Los Alamos, NM 87544 (US). **SHREVE, Andrew, P.**; 2233 Calle Alvarado, Santa Fe, NM 87505 (US). **WANG, Hsing-Lin**; 63 Hacienda Drive, Los Alamos, NM 87544 (US).

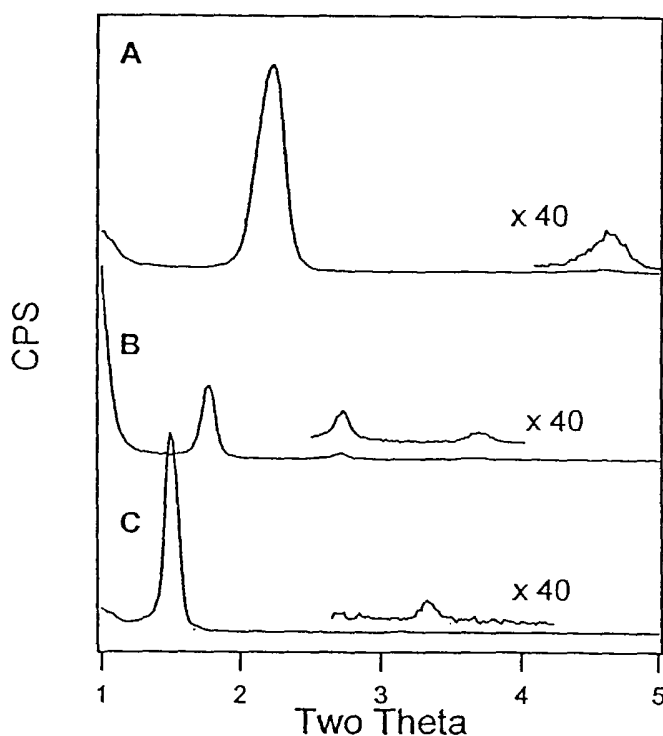
(74) Agents: **COTTRELL, Bruce, H.** et al.; Los Alamos National Laboratory, LC/IP, MS A 187, Los Alamos, NM 87545 (US).

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[Continued on next page]

(54) Title: CONJUGATED POLYMER DOPED NANOCOMPOSITE SILICA THIN FILMS



(57) Abstract: The present invention discloses a composite structure including an inorganic thin film having a defined mesostructure formed in a surfactant based formation process including a non-cationic surfactant template material, and, a conjugated polymer immobilized within the mesostructured inorganic thin film. A sensor using such a composite structure as a responsive element and a method of detecting trace amounts of nitro-containing organic species are also disclosed.

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INTERNATIONAL SEARCH REPORT

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<p>A. CLASSIFICATION OF SUBJECT MATTER</p> <p>IPC: G01N 33/22(2006.01);B05D 3/02(2006.01)</p> <p>USPC: 422/82.08,83,88,91;427/245,246,387,397.7;436/107,110,167,169,172</p> <p>According to International Patent Classification (IPC) or to both national classification and IPC</p>																						
<p>B. FIELDS SEARCHED</p> <p>Minimum documentation searched (classification system followed by classification symbols) U.S. : 422/82.08,83,88,91; 427/245,246,387,397.7; 436/107,110,167,169,172</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) Please See Continuation Sheet</p>																						
<p>C. DOCUMENTS CONSIDERED TO BE RELEVANT</p> <table border="1"> <thead> <tr> <th>Category *</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>Xi, H. et al, "Spectroscopic studies on conjugated polymers in mesoporous channels: influence of polymer side-chain length" Journal of Physics and Chemistry of Solids 2003, Vol. 64, pages 2451-2455, see entire document.</td> <td>1,4-7,9-12</td> </tr> <tr> <td>Y</td> <td>Hernandez, R. et al, "Controlled Placement of Luminescent Molecules and Polymers in Mesoporous Sol-Gel Thin Films" Journal of the American Chemical Society 2001, Vol. 123, No. 6, pages 1248-1249, see entire document.</td> <td>1-17</td> </tr> <tr> <td>Y</td> <td>Zhao, D. et al, "Nonionic Triblock and Star Diblock Copolymer and Oligomeric Surfactant Syntheses of Highly Ordered, Mesoporous Silica Structures" Journal of the American Chemical Society 1998, Vol. 120, No. 24, pages 6024-6036, see entire document.</td> <td>1-17</td> </tr> </tbody> </table>			Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	Xi, H. et al, "Spectroscopic studies on conjugated polymers in mesoporous channels: influence of polymer side-chain length" Journal of Physics and Chemistry of Solids 2003, Vol. 64, pages 2451-2455, see entire document.	1,4-7,9-12	Y	Hernandez, R. et al, "Controlled Placement of Luminescent Molecules and Polymers in Mesoporous Sol-Gel Thin Films" Journal of the American Chemical Society 2001, Vol. 123, No. 6, pages 1248-1249, see entire document.	1-17	Y	Zhao, D. et al, "Nonionic Triblock and Star Diblock Copolymer and Oligomeric Surfactant Syntheses of Highly Ordered, Mesoporous Silica Structures" Journal of the American Chemical Society 1998, Vol. 120, No. 24, pages 6024-6036, see entire document.	1-17								
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<p><input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.</p>																						
<p>* Special categories of cited documents:</p> <table border="0"> <tr> <td>"A"</td> <td>document defining the general state of the art which is not considered to be of particular relevance</td> <td>"T"</td> <td>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</td> </tr> <tr> <td>"B"</td> <td>earlier application or patent published on or after the international filing date</td> <td>"X"</td> <td>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</td> </tr> <tr> <td>"L"</td> <td>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)</td> <td>"Y"</td> <td>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</td> </tr> <tr> <td>"O"</td> <td>document referring to an oral disclosure, use, exhibition or other means</td> <td>"&"</td> <td>document member of the same patent family</td> </tr> <tr> <td>"P"</td> <td>document published prior to the international filing date but later than the priority date claimed</td> <td></td> <td></td> </tr> </table>			"A"	document defining the general state of the art which is not considered to be of particular relevance	"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	"B"	earlier application or patent published on or after the international filing date	"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	"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)	"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	"O"	document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family	"P"	document published prior to the international filing date but later than the priority date claimed		
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<p>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</p>		<p>Authorized officer Arlen Soderquist Telephone No. (571) 272-1700 Jacqueline A. Whitfield Special Project Asst. <i>JAW</i></p>																				

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US05/05701

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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Y	Chen, L. et al, "Surfactant-induced modification of quenching of conjugated polymer fluorescence by electron acceptors: applications for chemical sensing" Chemical Physics Letters 2000, Vol. 330, pages 27-33, see entire document.	13-17
A	US 6,387,453 B1 (BRINKER et al) 14 May 2002.	1-17
A	Burzynski, R. et al, "New photonics media prepared by sol-gel process" SPIE 1993, Vol. 1853, pages 158-162.	1-17
A	Wu, C.-G. et al, "Conducting Polyaniline Filaments in a Mesoporous Channel Host" Science 17 June 1994, Vol. 264, pages 1757-1759.	1-17
A	Lu, Y. et al, "Continuous formation of supported cubic and hexagonal mesoporous films by sol-gel dip-coating" Nature 25 September 1997, Vol. 389, pages 364-368.	1-17
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INTERNATIONAL SEARCH REPORT

International application No.
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Continuation of B. FIELDS SEARCHED Item 3:

STN search in CA and REGISTRY files

search terms: mesostru?, mesopor?, phenylene, sulfopropoxy, methoxy, poly, polymer, homopolymer, dop?, incorporat?, immobili?, sensor, sensing, detector, detecting, solgel, sol gel, nitro?, trinitro?, dinitro?, tnt, dt, poly?, polymer?