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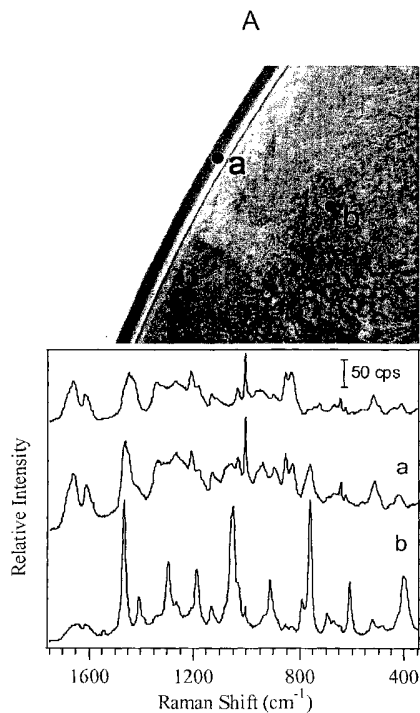
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G01N 21/65
- (21) International Application Number: PCT/US2004/010834 (72) Inventors: **ZHANG, Dongmao**; 2901 Manchester Street, West Lafayette, IN 47906 (US). **BEN-AMOTZ**; 3275 West 450 North, West Lafayette, IN 47906 (US). **XIE, Yong**; 147 Arnold Drive, Apt. 13, West Lafayette, IN 47906 (US). **DAVISSON, Vincent, J.**; 434 Littleton Street, West Lafayette, IN 47906 (US). **MROZEK, Melissa**; 300-C Ravenwood Lane, Lafayette, IN 47909 (US). **ORTIZ, Corazi**; 3422 Cheswick Court, Apt. D4, West Lafayette, IN 47906 (US).
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| 60/490,057 | 25 July 2003 (25.07.2003) | US | |
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| 60/554,701 | 19 March 2004 (19.03.2004) | US | |
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[Continued on next page]

(54) Title: PROCESS AND APPARATUS FOR SEGREGATION AND TESTING BY SPECTRAL ANALYSIS OF SOLID DEPOSITS DERIVED FROM LIQUID MIXTURES



(57) Abstract: Micro-droplets of liquid containing organic molecules of interest are dried on selected planar solvo-phobic substrates under conditions facilitating segregated precipitation of the larger, less soluble analytes toward edge portions of the deposit. Micro-spectrometer imaging using white light and FTIR false color can identify points of interest, and the same optics generally directed perpendicularly to the substrates selectively captures normal Raman spectra from selected points in the deposit. The spectra are manipulated using various data techniques to extract reliable information concerning analytes present at pico-Molar levels. The selected spots can also be subjected to FTIR spectroscopy followed by MALDI mass spectroscopy to obtain a variety of informations from the identical specimen.

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CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, 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, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

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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.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/10834

A. CLASSIFICATION OF SUBJECT MATTER
 IPC(7) : G01J 3/44; G01N 21/65
 US CL : 356/301
 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)
 U.S. : 356/301,36, 38

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)
 Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,334,837 A (IKEDA et al.) 02 August 1994 (02.08.1994), see the entire document particularly lines 41-65 of column 3, lines 24-41 of column 4, line 63-68 of column 5 and lines 1-26 of column 6.	1-39
A	US 4,841,145 A (WADA et al.) 20 June 1989 (20.06.1989), see column 2, lines 26-50.	1-39
A	US 5,605,838A (BACKHAUS et al.) 25 February 1997 (25.02.1997), see column 2, lines 12-27; column 7, lines 44-48 and column 10, lines 33-37.	1-39
A	DEEGAN et al. Capillary flow as the cause of ring stains from dried liquid drops, NATURE, October 23, 1997, Vol. 389, pages 827-829.	1-39

Further documents are listed in the continuation of Box C. See patent family annex.

<p>* Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"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</p> <p>"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</p> <p>"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</p> <p>"&" document member of the same patent family</p>
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<p>Date of the actual completion of the international search</p> <p>22 October 2004 (22.10.2004)</p>	<p>Date of mailing of the international search report</p> <p style="text-align: center; font-size: 1.2em;">14 JAN 2005</p>
<p>Name and mailing address of the ISA/US</p> <p>Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450</p> <p>Facsimile No. (703) 305-3230</p>	<p>Authorized officer</p> <p style="text-align: center;"><i>P. L. Evans</i></p> <p>Telephone No. 571 272-2800</p>

INTERNATIONAL SEARCH REPORT

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Continuation of B. FIELDS SEARCHED Item 3:

EAST

search terms: solvophobic, evaporat\$, solvate, hydrophobic, Raman, ring