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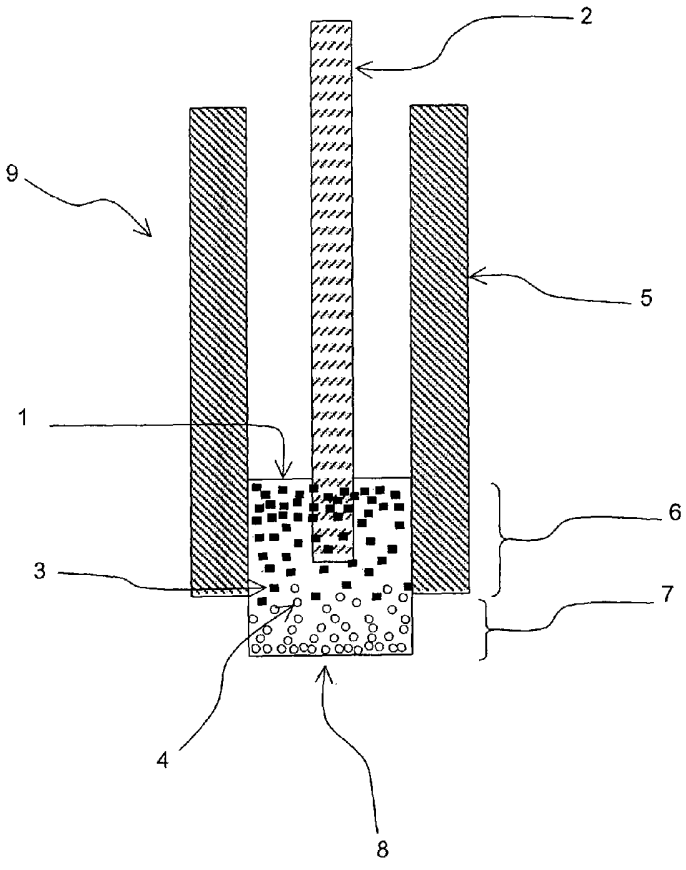
(54) Title: POTENTIOMETRIC ELECTRODE WITH A GRADIENT POLYMER COMPRISING CONDUCTIVE PARTICLES AND IONOPHORE MOLECULES



(57) Abstract: Potentiometric electrode and gradient polymer, both comprising electrically conducting particles, which increase in concentration away from one surface, ionophore molecules, which increase in concentration towards the same surface surface, and an electrical connection which passes proximal to said electrically conducting particles. Devices incorporating said electrode or gradient polymer, and to a method for their preparation. The new materials are highly robust and reliable.

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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, MC, 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).

Declaration under Rule 4.17:

— *of inventorship (Rule 4.17(iv)) for US only*

Published:

— *with international search report*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

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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/EP2005/004501

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G01N27/333

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 7 G01N

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 practical, search terms used)
EPO-Internal, INSPEC, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 4 454 007 A (PACE ET AL) 12 June 1984 (1984-06-12) column 3, line 64 - column 6, line 11 column 1 abstract; figures 1,2 ----- -/--	1-4,7,8, 36,37,51 5,6,9, 10,12-33

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in 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 document 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	Date of mailing of the international search report
30 August 2005	02. 11. 2005

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Klein, M-O

Form PCT/ISA/210 (second sheet) (January 2004)

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	ZIELINSKA D ET AL: "Potentiometric detection of organic acids in liquid chromatography using polymeric liquid membrane electrodes incorporating macrocyclic hexaamines" JOURNAL OF CHROMATOGRAPHY, ELSEVIER SCIENCE PUBLISHERS B.V. AMSTERDAM, NL, vol. 915, no. 1-2, 27 April 2001 (2001-04-27), pages 25-33, XP004233620 ISSN: 0021-9673 abstract	5,6,19, 20
X	US 5 288 388 A (FOMBON ET AL) 22 February 1994 (1994-02-22)	1-3,7,8, 10,33, 36,37,51
Y	column 3, line 53 - column 7, line 3 abstract; figures 1,2	9,10, 12-18, 21-33
X	EP 0 138 150 A (E.I. DU PONT DE NEMOURS AND COMPANY) 24 April 1985 (1985-04-24)	1,9,10, 37,51
A	the whole document	2-8, 12-33,36
A	US 2002/038762 A1 (EVENTOV IRINA ET AL) 4 April 2002 (2002-04-04) the whole document	1-33,36, 37,44,51
A	US 5 344 547 A (VLASOV ET AL) 6 September 1994 (1994-09-06) the whole document	1-33,36, 37,44,51
T	US 5 177 221 A (CRAM ET AL) 5 January 1993 (1993-01-05) columns 1-7	1-33,36, 37,44,51

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2005/004501

Box 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.:
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:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box 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:

see additional sheet

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.:

1-33, 36, 37, 44, 51

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-33,36,37,44,51

   polymeric material comprising a gradient composite of conductive particles and ionophores.

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2. claims: 38-43,45-50

   polymeric material comprising electrically conducting particles which decrease in concentration away from both surfaces.

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3. claims: 34,35

   chromatographic flow cell comprising potentiometric eleectrode comprising gradient composite with conducting particles and ionophores

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/EP2005/004501

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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US 5177221 A	05-01-1993	NONE	