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- (81) **Designated States** (*unless otherwise indicated, for every
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AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,
BZ, CA, CH, CL, 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, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU,
RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ,
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ZM, ZW.

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TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,
EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,
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- (88) **Date of publication of the international search report:**

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WO 2013/134251 A3

(54) **Title:** ANIONIC EXCHANGE-HYDROPHOBIC MIXED MODE

(57) **Abstract:** Anion exchange-hydrophobic mixed mode ligands and methods of their use are provided.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 13/29097

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - B01D 15/08; B01J 20/26 (2013.01)
USPC - 502/402; 502/400; 210/660

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)

USPC: 502/402; 502/400; 210/660

IPC: B01D 15/08; B01J 20/26 (2013.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

USPC: 210/656; 502/400 (See Search Words Below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PATBASE: PGPB, USPT, USOC, EPAB, JPAB

Google: Scholar/Patents: anion exchange chromatography support ethylene phenyl diamine mixed mode ligands amine linker N-phenylethylene diamine phenoxyethylamine

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4,415,631 A (SCHUTIJSER) 15 November 1983 (15.11.1983) Col 1, ln 7-15; Col 1, ln 48-60; Col 2,ln 2-3	1-4, 8-12
Y	US 2006/0135355 A1 (HEMS et al.) 22 June 2006 (22.06.2006) para [0010]; [0016]; [0028]	1-4, 8-12
A	US 6,783,929 B1 (ZUCKERMAN et al.) 31 August 2004 (31.08.2004) entire document	1-4, 8-12

Further documents are listed in the continuation of Box C.

* 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 application or patent but 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)	"&" 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
08 April 2013 (08.04.2013)

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13 MAY 2013

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 13/29097

Box No. 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.: 5-7 and 13-19
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. 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:

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 additional fees, this Authority did not invite payment of additional fees.
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.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.