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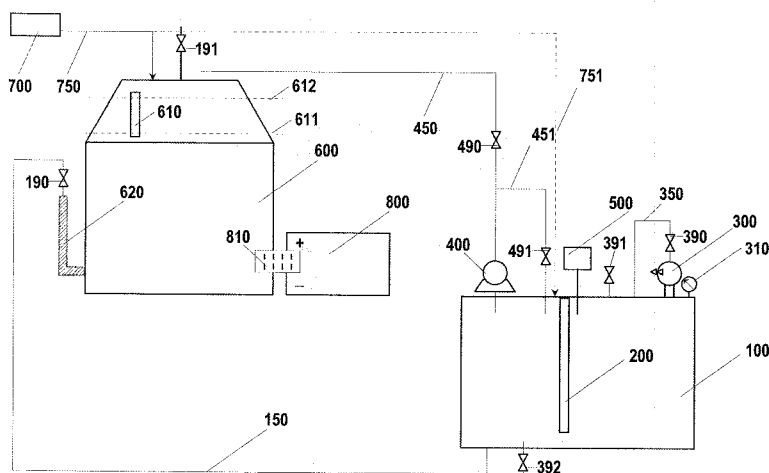


Fig. 1

(57) Abstract: The invention relates to a synthetic diaphragm for chlor-alkali cells with improved energy consumption and gas separation characteristics. The diaphragm consists of a network of polymer fibres bound to a hydrophilic ceramic material containing zirconium chemically bound to hydroxyl groups. The ceramic material is obtained starting from ZrO_2 by a process of hydration under vacuum which can be carried out directly in the cell by means of a suitable equipment.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2008/066670

A. CLASSIFICATION OF SUBJECT MATTER
INV. C25B13/04 C25B1/46

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)
C25B H01M D02J C02F D01F D01D

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, 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	US 5 683 749 A (DUBOIS DONALD W [US] ET AL) 4 November 1997 (1997-11-04) claims 1,3,5,7	1-13
X	US 4 720 334 A (DUBOIS DONALD W [US] ET AL) 19 January 1988 (1988-01-19) claims 1,10,15	1,2
A		3-13
X	US 4 853 101 A (HRUSKA LOUIS W [US] ET AL) 1 August 1989 (1989-08-01) cited in the application column 8, lines 23-42; claims 1,10-13,17,18	1,2
X	US 4 264 691 A (O'RELL DENNIS D ET AL) 28 April 1981 (1981-04-28) claims 1,2	1,2
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Further documents are listed in the continuation of Box C.

See patent family 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.
- *Z* document member of the same patent family

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INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2008/066670

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 4 193 861 A (ARGADE SHYAM D [US] ET AL) 18 March 1980 (1980-03-18)	14
A	column 4, lines 40-48; examples 1,2 -----	15-21
A	US 5 919 348 A (FRIEDRICH HOLGER [DE] ET AL) 6 July 1999 (1999-07-06) column 2, line 64 - column 3, line 21; example 1 -----	15-21
A	WO 93/16217 A (DOW CHEMICAL CO [US]) 19 August 1993 (1993-08-19) page 6, columns 5-17; example 8 -----	14-21
A	US 4 354 900 A (BAILEY RODNEY R ET AL) 19 October 1982 (1982-10-19) claim 1 -----	14-21

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2008/066670

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.:
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:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers allsearchable claims.

2. As all searchable claims could be searched without effort justifying an 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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-13

Claims 1-3 are directed towards a separator for a chlor-alkali electrolysis cell, and a method of its production directly on a porous metal cathode. The separator comprises polymer fibers and ceramic particles with Zr-OH bindings mechanically bound thereto.

2. claims: 14-21

Claims 14-21 are directed towards a method and equipment for conditioning or washing a separator for a chlor-alkali electrolysis cell while applying a negative pressure.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/EP2008/066670

Patent document cited in search report	A	Publication date	Patent family member(s)	Publication date
US 5683749	A	04-11-1997	NONE	
US 4720334	A	19-01-1988	NONE	
US 4853101	A	01-08-1989	NONE	
US 4264691	A	28-04-1981	BE 884290 A1	03-11-1980
			CA 1159109 A1	20-12-1983
			CH 644972 A5	31-08-1984
			DE 3026246 A1	29-01-1981
			ES 8106377 A1	16-10-1981
			FR 2461364 A1	30-01-1981
			GB 2057028 A	25-03-1981
			IT 1149997 B	10-12-1986
			NL 8004016 A	15-01-1981
			SE 448658 B	09-03-1987
			SE 8005050 A	14-01-1981
US 4193861	A	18-03-1980	CA 1137026 A1	07-12-1982
US 5919348	A	06-07-1999	DE 19650316 A1	10-06-1998
			EP 0846789 A1	10-06-1998
			JP 10273792 A	13-10-1998
			NO 975601 A	05-06-1998
WO 9316217	A	19-08-1993	AU 3603393 A	03-09-1993
US 4354900	A	19-10-1982	BE 891255 A1	26-05-1982
			BR 8107763 A	31-08-1982
			CA 1169814 A1	26-06-1984
			DE 3147106 A1	16-06-1982
			FR 2495195 A1	04-06-1982
			JP 57123988 A	02-08-1982
			NL 8105410 A	01-07-1982