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(54) Title: FLUOROPOLYMER MEMBRANE

(57) Abstract: A porous fluoropolymer membrane comprising a first surface, a second surface, nodes and free fibrils, wherein one of the first and second surfaces has a greater number of free fibrils per unit area of the surface than the other of the first and second surfaces, is disclosed. A process for preparing porous fluoropolymer membranes is also disclosed, comprising splitting a thicker membrane in a dimension different from, e.g., perpendicular to, its thickness dimension.



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INTERNATIONAL SEARCH REPORT

International Application No

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A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B01D69/12 B01D71/36 B01D71/32 B01D67/00 B01D69/02
B01D39/16 B29C55/00 C08J5/18 C08L27/18

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)

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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, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 248 924 A (K.OKITA) 3 February 1981 (1981-02-03) column 2, lines 47-63	1-7, 22
A	US 4 973 609 A (R.BROWNE) 27 November 1990 (1990-11-27) abstract; claims	1-7, 22
A	US 4 082 893 A (K.OKITA) 4 April 1978 (1978-04-04) claims	1-7, 22
A	US 2002/001704 A1 (B.G.RUEFER ET AL) 3 January 2002 (2002-01-03) claims	1-7, 22
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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- * & * document member of the same patent family

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 03/22907

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 525 630 A (DAIKIN INDUSTRIES, LTD) 3 February 1993 (1993-02-03) claims 1-5 -----	1-7,22
A	US 5 814 405 A (PH.A.BRANCA ET AL) 29 September 1998 (1998-09-29) cited in the application claims 1,9,10 -----	1-7,17, 22

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 03/22907

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4248924	A	03-02-1981	JP 1402611 C 28-09-1987
			JP 53030668 A 23-03-1978
			JP 60003842 B 31-01-1985
			CA 1099464 A1 21-04-1981
			DE 2739705 A1 16-03-1978
			FR 2363351 A1 31-03-1978
			GB 1586224 A 18-03-1981
			US 4277429 A 07-07-1981
US 4973609	A	27-11-1990	NONE
US 4082893	A	04-04-1978	JP 1007856 B 10-02-1989
			JP 1554479 C 23-04-1990
			JP 52132078 A 05-11-1977
			JP 1199017 C 05-04-1984
			JP 52077181 A 29-06-1977
			JP 58015295 B 24-03-1983
			CA 1046433 A1 16-01-1979
			DE 2658656 A1 07-07-1977
			FR 2336622 A1 22-07-1977
			GB 1577326 A 22-10-1980
			US 4234535 A 18-11-1980
			US 4104394 A 01-08-1978
US 2002001704	A1	03-01-2002	US 6342294 B1 29-01-2002
			US 2002001705 A1 03-01-2002
EP 0525630	A	03-02-1993	CA 2074349 A1 24-01-1993
			CA 2435405 A1 24-01-1993
			CN 1072351 A ,B 26-05-1993
			DE 69208552 D1 04-04-1996
			DE 69208552 T2 05-09-1996
			DE 69228002 D1 04-02-1999
			DE 69228002 T2 10-06-1999
			EP 0525630 A2 03-02-1993
			EP 0611790 A2 24-08-1994
			ES 2086591 T3 01-07-1996
			ES 2126672 T3 01-04-1999
			JP 2792354 B2 03-09-1998
			JP 5202217 A 10-08-1993
			KR 258485 B1 15-06-2000
			KR 260966 B1 15-06-2000
			KR 260967 B1 15-06-2000
			RU 2103283 C1 27-01-1998
			US 5234739 A 10-08-1993
US 5814405	A	29-09-1998	DE 19544912 A1 05-06-1997
			AT 236210 T 15-04-2003
			AU 1032797 A 27-06-1997
			AU 6687396 A 05-03-1997
			BG 64234 B1 30-06-2004
			BG 102398 A 30-12-1998
			CA 2233695 A1 20-02-1997
			CN 1203610 A ,B 30-12-1998
			DE 59610317 D1 08-05-2003
			DE 69617707 D1 17-01-2002
			DE 69617707 T2 08-05-2002
			WO 9720881 A1 12-06-1997

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 03/22907

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5814405	A	EP 0850265 A1	01-07-1998
		EP 0951500 A1	27-10-1999
		ES 2164909 T3	01-03-2002
		JP 11515036 T	21-12-1999
		JP 11501973 T	16-02-1999
		PL 327032 A1	09-11-1998
		US 6218000 B1	17-04-2001
		WO 9706206 A1	20-02-1997