

Title (en)  
GAS SEPARATION MEMBRANES CONTAINING A MICROPOROUS SILICA LAYER BASED ON SILICA DOPED WITH A TRIVALENT ELEMENT

Title (de)  
GASTRENNMEMBRANEN MIT EINER MIKROPORÖSEN SILICIUMDIOXIDSCHICHT AUF BASIS VON MIT EINEM DREIWERSTIGEN ELEMENT DOTIERTEM SILICIUMDIOXID

Title (fr)  
MEMBRANES DE SEPARATION DE GAZ CONTENANT UNE COUCHE DE SILICE MICROPOREUSE A BASE DE SILICE DOPEE PAR UN ELEMENT TRIVALENT

Publication  
**EP 1971422 A1 20080924 (FR)**

Application  
**EP 06847128 A 20061222**

Priority  
• FR 2006002858 W 20061222  
• FR 0513150 A 20051222

Abstract (en)  
[origin: FR2895275A1] In the production of a gas separation membrane (I) by depositing a film of silica sol on a porous support then thermally treating the film, the silica sol to be deposited in film form is prepared by hydrolyzing a silicon alkoxide in presence of a doping amount of a trivalent element oxide precursor (II). Independent claims are included for: (1) a membrane (I) with a microporous layer of trivalent element-doped silica deposited on the support, obtained by the above process; and (2) a gas separation membrane (I'), comprising a microporous boron-doped silica layer deposited on a mesoporous support (with no restrictions as to the production method).

IPC 8 full level  
**B01D 71/02** (2006.01); **B01D 53/22** (2006.01)

CPC (source: EP KR US)  
**B01D 53/228** (2013.01 - EP KR US); **B01D 67/0048** (2013.01 - EP KR US); **B01D 67/0083** (2013.01 - EP KR US);  
**B01D 67/0088** (2013.01 - EP KR US); **B01D 69/105** (2013.01 - EP KR US); **B01D 69/141** (2013.01 - EP KR); **B01D 69/14111** (2022.08 - US);  
**B01D 71/027** (2013.01 - EP KR US); **C04B 35/14** (2013.01 - EP KR US); **C04B 35/624** (2013.01 - EP KR US);  
**C04B 41/009** (2013.01 - EP KR US); **C04B 41/5035** (2013.01 - EP KR US); **C04B 41/52** (2013.01 - EP KR US);  
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C-Set (source: EP US)  
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2. **C04B 41/5035 + C04B 41/4537 + C04B 41/5031**  
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4. **C04B 41/52 + C04B 41/4537 + C04B 41/5035**  
5. **C04B 41/009 + C04B 35/10**  
6. **C04B 41/009 + C04B 38/00**

Citation (examination)  
• US 2003116061 A1 20030626 - AONO TOSHIAKI [JP], et al  
• US 5589153 A 19961231 - GARCES JUAN M [US], et al  
• US 6177373 B1 20010123 - STERTE PER JOHAN [SE], et al  
• APARICIO M ET AL: "Thick sol-gel coatings based on the B2O3-SiO2 system", JOURNAL OF NON-CRYSTALLINE SOLIDS, NORTH-HOLLAND PHYSICS PUBLISHING. AMSTERDAM, NL, vol. 218, 1 September 1997 (1997-09-01), pages 146 - 150, XP004095566, ISSN: 0022-3093, DOI: 10.1016/S0022-3093(97)00073-2  
• NAITO M ET AL: "Process conditions on the preparation of supported microporous SiO2 membranes by sol-gel modification techniques", JOURNAL OF MEMBRANE SCIENCE, ELSEVIER SCIENTIFIC PUBL.COMPANY. AMSTERDAM, NL, vol. 129, no. 2, 9 July 1997 (1997-07-09), pages 263 - 269, XP004084478, ISSN: 0376-7388, DOI: 10.1016/S0376-7388(97)00020-3  
• See also references of WO 2007077358A1

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DOCDB simple family (publication)  
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