

최신 미국특허 등록 목록

■ Polymer membrane for fuel cell, method of preparing same, and membrane-electrode assembly for fuel cell comprising same

- 등록번호 : 7871736
- 발명자 : An, Sung-Guk(Suwon-si, KR), Song, Min-Kyu(Suwon-si, KR), Park, Young-Mi(Suwon-si, KR), Kim, You-Mee(Suwon-si, KR), Han, Sang-Il(Suwon-si, KR), Kweon, Ho-Jin(Suwon-si, KR), Lee, Si-Hyun(Suwon-si, KR)
- 출원인 : Samsung SDI Co., Ltd.(Gongse-dong, Giheung-gu, Yongin-si, Gyeonggi-do, KR)
- 초록 : The polymer electrolyte membrane of the present invention includes polymers having a fluoroalkyl group and a proton conductive group. The present invention also provides a membrane-electrode assembly, a fuel cell system including the polymer electrolyte membrane, and a method of making the polymer electrolyte membrane by a chemical grafting method. The amount of the proton conductive groups in the polymer electrolyte membrane can be controlled, the membrane thickness can be easily controlled, adherence between a polymer electrolyte membrane and an electrode is improved due to the fluoroalkyl of the polymer, and long-term stability of a membrane-electrode assembly is improved.

■ Membranes with controlled permeability to polar and apolar molecules in solution and methods of making same

- 등록번호 : 7871456
- 발명자 : Gough, David A.(Solana Beach, CA, US), Lucisano, Joseph Y.(San Diego, CA, US),

Lin, Joe T.(San Diego, CA, US), Tsay, Hwai-Min(San Diego, CA, US), Lim, Drahoslav(San Diego, CA, US), Limova, legal representative, Jana(San Diego, CA, US)

- 출원인 : The Regents of the University of California(Oakland, CA, US)
- 초록 : A membrane for use in an implantable glucose sensor including at least one crosslinked substantially hydrophobic polymer and at least one crosslinked substantially hydrophilic polymer; wherein the first and second polymers are different polymers and substantially form an interpenetrating polymer network, semi-interpenetrating polymer network, polymer blend, or copolymer. The membranes are generally characterized by providing a permeability ratio of oxygen to glucose of about 1 to about 1000 in units of (mg/dl glucose) per (mmHg oxygen). Three methods of making membranes from hydrophobic and hydrophilic monomers formed into polymer networks are provided, wherein according to at least two of the methods, the monomers may be substantially immiscible with one another.

■ Separation membrane for fuel battery and process for producing the same

- 등록번호 : 7868051
- 발명자 : Fukuta, Kenji(Yamaguchi, JP), Isomura, Takenori(Yamaguchi, JP), Kishino, Masayuki(Yamaguchi, JP)
- 출원인 : Tokuyama Corporation(Yamaguchi, JP)
- 초록 : There are disclosed a membrane for a fuel cell in which voids in a porous membrane are filled with a crosslinking type ion exchange resin having both cation-exchange group and anion-exchange group via a covalent bond,

wherein the ion exchange resin has ion-exchange groups with either polarity more than ion-exchange groups with the opposite polarity and at least 40% of the ion-exchange groups of the opposite polarity form ion complexes with the ion-exchange groups of the major polarity, as well as a producing process therefor.

■ **Sulfonated aryl sulfonate matrices and method of production**

- 등록번호 : 7868050
- 발명자 : Schindler, Bernd(Postschulenweg 4, 70569 Stuttgart, DE), Richard(3660 Cielo Del Mar, San Diego, CA, US)
- 출원인 : -
- 초록 : Porous matrices and membrane matrices comprising sulfonated aryl sulfonate polymers are prepared from a sulfonated aryl sulfonate polymer solution which is made by dissolving an aryl sulfonate polymer, and optionally a polymer other than aryl sulfonate, in a sulfonating acid solvent such as sulfuric acid. The solutions are then cast as wet films from which the matrices are coagulated. By controlling composition and process parameters, hydrophilic matrices of varying morphology are produced.

■ **Cross-linked polymersomes and related encapsulating membranes**

- 등록번호 : 7867512
- 발명자 : Discher, Dennis E.(Philadelphia, PA, US), Discher, Bohdana M.(Philadelphia, PA, US), Won, You-Yeon(West Lafayette, IN, US), Lee, James C-M(Columbia, MO, US), Hammer, Daniel A.(Villanova, PA, US), Bates, Frank(Minneapolis, MN, US)
- 출원인 : The Trustees of the University of Pennsylvania(Philadelphia, PA, US), Regents of the University of Minnesota(Minneapolis, MN, US)

- 초록 : The present invention provides biocompatible vesicles comprising semi-permeable, thin-walled encapsulating membranes which are formed in an aqueous solution, and which comprise one or more synthetic super-amphiphilic molecules. When at least one super-amphiphile molecule is a block copolymer, the resulting synthetic vesicle is termed a "polymersome." The synthetic, reactive nature of the amphiphilic composition enables extensive, covalent cross-linking of the membrane, while maintaining semi-permeability. Cross-linking of the polymer building-block components provides mechanical control and long-term stability to the vesicle, thereby also providing a means of controlling the encapsulation or release of materials from the vesicle by modifying the composition of the membrane. Thus, the encapsulating membranes of the present invention are particularly suited for the reliable, durable and controlled transport, delivery and storage of materials.

■ **Composite ceramic hollow fibres method for production and use thereof**

- 등록번호 : 7866486
- 발명자 : Werth, Steffen(Solingen, DE), Dinges, Nicole(Reutlingen, DE), Kilgus, Mirjam(Glatten, DE), Schiestel, Thomas(Stuttgart, DE)
- 출원인 : Uhde GmbH(Dortmund, DE), BORSIG Process Heat Exchanger GmbH(Berlin, DE)
- 초록 : Composites comprising at least one hollow fiber of oxygen-transporting ceramic material, which is a ceramic material which conducts oxygen anions and electrons or a combination of ceramic material which conducts oxygen anions and a ceramic or nonceramic material which conducts electrons, with the outer surface of the hollow fiber being in contact with the outer surface of the same hollow fiber or another hollow fiber and the contact points being joined by sintering, are

described. Further composites comprise at least one hollow fiber of oxygen-transporting ceramic material which is a ceramic material which conducts oxygen anions and electrons or a combination of ceramic material which conducts oxygen anions and ceramic or nonceramic material which conducts electrons and a connection element for the introduction or discharge of fluids at at least one end face, with hollow fibers and connection element being joined. The composites can be used for isolating oxygen from oxygen-containing gas mixtures or for carrying out oxidation reactions.

■ **Membrane electrode composite module, fuel cell and electronic equipment, and method of manufacturing the membrane electrode composite module**

- 등록번호 : 7862952
- 발명자 : Kohno, Ryuji(Kasumigaura, JP), Nagata, Tatsuya(Ishioka, JP), Kitano, Makoto (Tsuchiura, JP), Seido, Masahiro(Tokyo, JP), Nakagawa, Kazuhiko(Tokyo, JP)
- 출원인 : Hitachi, Ltd.(Tokyo, JP), Hitachi Cable, Ltd.(Tokyo, JP)
- 초록 : According to the present invention, there is provided a membrane electrode composite module including a membrane electrode composite formed by sandwiching both surfaces of an electrolyte membrane between gas diffusion electrodes, an anode current collecting plate having fuel flow holes through which fuel flows, and a cathode current collecting plate having oxygen flow holes through which oxygen flows, wherein both surfaces of the membrane electrode composite are sandwiched between the anode current collecting plate and the cathode current collecting plate, the membrane electrode composite module further including films made of a synthetic resin (a first film and a second film) which are a base of the anode current collecting plate and a base of the cathode current collecting plate.

■ **Electrolyte membrane using polybenzoxazine based compound and method of manufacturing the same**

- 등록번호 : 7858668
- 발명자 : Lee, Myung-jin(Seoul, KR), Choi, Seong-woo(Yongin-si, KR), Sun, Hee-young(Yongin-si, KR), Jeon, Woo-sung(Suwon-si, KR)
- 출원인 : Samsung SDI Co., Ltd.(Suwon-si, Gyeonggi-do, KR)
- 초록 : An electrolyte membrane includes a cross-linked reaction product of a benzoxazine monomer and a cross-linkable compound. The electrolyte membrane is impregnated with 300 to 600 parts by weight of phosphoric acid based on 100 parts by weight of the electrolyte membrane, and has a yield strain 0.5% or less, and a yield stress 0.3 Mpa or less. The cross-linked material has a strong acid trapping ability with respect to the benzoxazine compound and excellent mechanical properties due to a cross-linkage. Also, the solubility of the cross-linked material in polyphosphoric acid is low, thereby showing excellent chemical stability. Accordingly, when the cross-linked material is used, an electrolyte membrane having an excellent liquid supplementing ability and excellent mechanical and chemical stability at a high temperature can be obtained. The cross-linked material can be obtained by a simple polymerization process by combining a benzoxazine monomer and a crosslinkable compound and by using heat instead of using a polymerization initiator or a cross-linking agent.

■ **Solid polymer electrolyte fuel cell and method for manufacturing the same**

- 등록번호 : 7858263
- 발명자 : Fukuda, Kaoru(Wako, JP), Takahashi, Ryoichiro(Wako, JP), Matsuo, Junji (Wako, JP), Tada, Tomoyuki(Hiratsuka, JP), Inoue, Masahiko(Hiratsuka, JP), Matsutani, Koichi(Hiratsuka, JP)

- 출원인 : Honda Motor Co., Ltd.(Tokyo, JP),
Tanaka Kikinzoku Kogyo K.K.
(Tokyo, JP)

- 초록 : A solid polymer electrolyte fuel cell comprises: a plurality of electrode structures comprising an anode and a cathode, and polymer electrolyte membrane held between the anode and the cathode, and a plurality of separators for holding the respective electrode structures, with a fuel gas passage for supplying and discharging fuel gas containing hydrogen on a surface opposing the anode; and an oxidant gas passage for supplying and discharging oxidant gas on a surface opposing the cathode. The catalyst layer of the anode comprises a mixture of an ion conductive material, a platinum powder and/or platinum alloy powder and a carbon, the platinum powder and/or platinum alloy powder and carbon substantially exist independently from each other, and the catalyst layer of the cathode comprises a metal support mixture in which the ion conductive material and the electro-conductive material having the supported catalyst material are mixed.

■ Membrane for filtering of water

- 등록번호 : 7857978
- 발명자 : Jensen, Peter Holme(Copenhagen, DK), Keller, Danielle(Odense, DK), Nielsen, Claus Helix(Taastrup, DK)
- 출원인 : Aquaporin A/S(Copenhagen N, DK)
- 초록 : Disclosed are novel water membranes comprising lipid bilayers incorporating functional aquaporins. The lipid bilayers are arranged in sandwich structures including hydrophilic or hydrophobic support materials. Also disclosed are water purification devices/systems, including reverse osmosis filtering devices that include membranes having functional aquaporins. Methods of water purification and methods of preparing

the membranes are also disclosed. Further, the invention provides for a new type of perforated, hydrophobic polymer film and to membranes containing lipid bilayers having other transmembrane proteins than aquaporins introduced.

■ Membrane devices with controlled transmembrane pressure and method of use

- 등록번호 : 7854846
- 발명자 : Goldsmith, Robert L.(Wayland, MA, US), Bishop, Bruce A.(Arlington, MA, US)
- 출원인 : Ceramem Corporation(Plainfield, IL, US)
- 초록 : A crossflow membrane device that receives a feedstock at a feed end face and separates the feedstock into permeate and retentate. The device has a membrane support containing at least one monolith of porous material defining a plurality of passageways extending longitudinally from the feed end face of the monolith to a retentate end face of the monolith through which the feedstock flows to pass retentate from the device. A permselective membrane coating of finer pore size than that of the porous material is applied to the passageway wall surfaces of the monolith. At least one permeate conduit is formed within the monolith, the conduit containing a plurality of longitudinal permeate chambers communicating with a means of permeate introduction at or near the feed end face and permeate withdrawal at or near the retentate end face. The permeate is separated from feed and retentate, and a portion of the permeate is circulated through the permeate conduit to create a decreasing permeate pressure within the permeate conduit from the feed end of the membrane device to the retentate end of the device to control transmembrane pressure along the length of the device.

■ Polymer electrolyte membranes (PEMs) based on imidazole ring terminated flexible branches grafted on hybrid inorganic-organic polymers

- 등록번호 : 7851580
- 발명자 : Li, Siwen(Atlanta, GA, US), Liu, Meilin (Alpharetta, GA, US), Sun, Qunhui (Kennesaw, GA, US), Li, Wen(Ann Arbor, MI, US)
- 출원인 : Toyota Motor Engineering & Manufacturing North America, Inc.(Erlanger, KY, US), Georgia Tech Research Corporation (Atlanta, GA, US)
- 초록 : A composition of matter comprises a polymer network, including silicon atoms and oxygen atoms, a first organic side-chain attached to at least some silicon atoms within the polymer network comprising a flexible linking group and a terminal group, the terminal group including at least one atom providing a lone pair of electrons. The composition of matter can be used to form a proton-conducting membrane. In illustrative examples, the polymer network can be an organic-inorganic hybrid network and the terminal group can include a nitrogen-containing heterocycle.

■ Organic/inorganic composite electrolyte membranes using zeolite and fuel cell comprising the same

- 등록번호 : 7851557
- 발명자 : Park, Yong Su(Daejeon, KR), Shin, Chong Kyu(Daejeon, KR), Sohn, Kwon Nam(Daejeon, KR), Lee, Bong Keun (Daejeon, KR), Chang, Jae Hyuk (Daejeon, KR), Kim, Eun Ju(Daejeon, KR)
- 출원인 : LG Chem, Ltd.(Seoul, KR)
- 초록 : Disclosed is an organic/inorganic composite electrolyte membrane comprising: (a) a sulfonated fluorine-free hydrocarbon-based polymer; and (b) inorganic particles capable of collecting moisture, wherein the inorganic particles include zeolite. Also, disclosed are an electrode comprising the zeolite as a component for form-

ing a catalyst layer, a membrane electrode assembly comprising the electrolyte membrane and/or the electrode, and a fuel cell having the membrane electrode assembly. The organic/inorganic composite electrolyte membrane using the hydrophilic zeolite in combination with the sulfonated fluorine-free hydrocarbon-based polymer shows high proton conductivity, and thus can impart excellent quality to a fuel cell even under high-temperature and low-humidity conditions.

■ Porous membrane and method for manufacturing the same

- 등록번호 : 7851024
- 발명자 : Morikawa, Hirofumi(Kusatsu, JP), Minegishi, Shin-Ichi(Otsu, JP), Furuno, Shuji(Kyoto, JP), Ishizaki, Toshiyuki (Gamo-gun, JP), Henmi, Masahiro (Otsu, JP)
- 출원인 : Toray Industries, Inc.(Tokyo, JP)
- 초록 : A method for manufacturing a porous membrane including a three-dimensional network structure and a spherical structure is provided. The method includes forming a porous membrane having a spherical structure, applying a resin solution onto at least one surface of the porous membrane having the spherical structure, followed by immersing the membrane in a solidification liquid, thereby forming the three-dimensional network structure on at least one surface of a porous membrane having the spherical structure.

■ Polyphenylene sulfide resin, process for producing the same, and fiber comprising the same

- 등록번호 : 7847055
- 발명자 : Saitoh, Kei(Nagoya, JP), Ishio, Atsushi (Nagoya, JP), Unohara, Takeshi(Nagoya, JP)
- 출원인 : Toray Industries, Inc.(Tokyo, JP)

- 초록 : A polyphenylene sulfide resin treated by thermal oxidation has a generated gas amount of 0.23 wt % or less when the resin is heated and melted in vacuum at 320°C. for 2 hours; a residual amount of 3.0 wt % or less as a residue when the resin is dissolved in an amount corresponding to 20 times the weight of the resin, of 1-chloronaphthalene at 250°C. for 5 minutes and, as the 1-chloronaphthalene solution, pressure-filtered in a still hot state by a PTFE membrane filter with a pore size of 1 μm or less; and a melt flow rate (measured at a temperature of 315.5°C. and at a load of 5000 g according to ASTM D-1238-70) of more than 100 g/10 min to 500 g/10 min.
- **Method for the synthesis of a polyoxadiazole polymer**
- 등록번호 : 7847054
 - 발명자 : de Figueiredo Gomes, Dominique (Apensen, DE), Loos, Marcio Rodrigo (Geesthacht, DE)
 - 출원인 : GKSS-Forschungszentrum Geesthacht GmbH(Geesthacht, DE)
 - 초록 : A polyoxadiazole polymer is synthesized by heating polyphosphoric acid to a temperature of at least about 160°C. and making a solution by mixing hydrazine sulfate salt with one or more dicarboxylic acids or their derivatives in the heated polyphosphoric acid. The solution is heated under an inert gas atmosphere and the polymer is precipitated in a basic solution. The polyoxadiazole polymer can be produced as a homopolymer or copolymer, and may be used to produce a membrane or fibers.
- **Polymer electrolytic membrane, and fuel cell employing the same**
- 등록번호 : 7846981
 - 발명자 : Lee, Won-mok(Seoul, KR), Kim, Hae-young(Seoul, KR)
- 출원인 : Samsung SDI Co., Ltd.(Suwon-si, Gyeonggi-do, KR)
 - 초록 : A proton conductive copolymer includes styrene repeating units that have proton conductive functional groups and dimethylsiloxane repeating units. A polymer electrolyte membrane includes the proton conductive copolymer and a fuel cell uses the polymer electrolyte membrane. The proton conductive copolymer has excellent chemical and mechanical properties, excellent ability to form membrane with dimethylsiloxane repeating units, and superior ion conductivity with styrene repeating units that have proton conductive functional groups. Polymer electrolyte membranes that have properties appropriate for the fuel cell electrolyte membrane can be obtained using the proton conductive copolymer. Fuel cells that have improved efficiencies can be obtained using the polymer electrolyte membrane.
- **Method of manufacturing porous polytetrafluoroethylene membrane, filter medium, and filter unit**
- 등록번호 : 7846238
 - 발명자 : Suzuki, Masatoshi(Osaka, JP), Uchida, Youji(Osaka, JP)
 - 출원인 : Nitto Denko Corporation(Osaka, JP)
 - 초록 : Provided is a method of manufacturing a porous polytetrafluoroethylene (PTFE) membrane capable of achieving both a high collection efficiency and a low pressure drop, though it has a larger average pore size and a greater thickness than conventional porous PTFE membranes. This manufacturing method includes: stretching an unsintered polytetrafluoroethylene sheet by a factor of 5 to 30 in a predetermined direction at a temperature equal to or higher than the melting point of polytetrafluoroethylene; further stretching the stretched sheet by a factor of 5 to 40 in a direction different from the pre-

determined direction at a temperature lower than the melting point; and after the stretchings, heating the stretched sheet at a temperature equal to or higher than the melting point.

■ **Microfabricated acoustic transducer with a multi-layer electrode**

- 등록번호 : 7839722
- 발명자 : Wagner, Paul A.(San Carlos, CA, US), Ladabaum, Igal(San Carlos, CA, US), Jackson, Kathy J.(Felton, CA, US)
- 출원인 : Siemens Medical Solutions USA, Inc.(Malvern, PA, US)
- 초록 : In a capacitive membrane ultrasound transducer, one or more electrodes include multiple layers of conductive or semiconductive material. The layers may be positioned adjacent an insulator or cavity in an arrangement to reduce electrical degradation. For example, a conductive layer with less work function and less resistivity is spaced from an insulator by a conductive layer with more work function and more resistivity. The different layers of electrode material may provide for less electrical degradation due to the type of material used and relative location.

■ **Perfluoropolyether rubber composition and ion-conducting polymer electrolyte membrane**

- 등록번호 : 7838616
- 발명자 : Fukushima, Motoo(Annaka, JP), Yamaya, Masaaki(Annaka, JP), Yamamoto, Akira(Annaka, JP), Sato, Shinichi (Annaka, JP), Kishita, Hirofumi (Annaka, JP)
- 출원인 : Shin-Etsu Chemical Co., Ltd.(Tokyo, JP)
- 초록 : A perfluoropolyether rubber composition is useful for forming a polymer electrolyte membrane, comprising (A) an alkenyl-containing perfluoropolyether, (B) a silicon-oxygen crosslinked structure having ionic conduction, and (C) a peroxide crosslinker. The silicon-oxygen crosslinked structure is obtained by simultaneously effecting oxidation and hydrolysis on an organoxysilane

having an epoxy group and an organoxysilane having a mercapto group for thereby converting the mercapto group into a sulfonic group, and neutralizing the resulting sulfonic group-containing siloxane with a nitrogen-containing compound.

■ **Membrane/electrode assembly with multilayered cathode catalyst for polymer electrolyte fuel cells**

- 등록번호 : 7838170
- 발명자 : Hommura, Satoru(Chiyoda-ku, JP), Kinoshita, Shinji(Chiyoda-ku, JP), Shimoda, Hiroshi (Chiyoda-ku, JP), Saito, Susumu(Chiyoda-ku, JP), Kotera, Seigo (Chiyoda-ku, JP), Shimohira, Tetsuji (Chiyoda-ku, JP), Nakagawa, Hideki (Chiyoda-ku, JP)
- 출원인 : Asahi Glass Company, Limited(Tokyo, JP)
- 초록 : To provide a membrane/electrode assembly for polymer electrolyte fuel cells, a polymer electrolyte fuel cell and processes for their production, which make it possible to stably exhibit a high power generation performance in various environments. A membrane/electrode assembly for polymer electrolyte fuel cells, which comprises a first electrode having a first catalyst layer and a first gas diffusion layer, a second electrode having a second catalyst layer and a second gas diffusion layer, and a polymer electrolyte membrane disposed between the first electrode and the second electrode, wherein the 90° peel strength at least one of the interface between the first electrode and the polymer electrolyte membrane and the interface between the second electrode and the polymer electrolyte membrane is at least 0.03 N/cm.

■ **Protective composite battery separator and electrochemical device component with red phosphorus**

- 등록번호 : 7838144
- 발명자 : Visco, Steven J.(Berkeley, CA, US),

Nimon, Yevgeniy S.(Danville, CA, US),
Katz, Bruce D.(Berkeley, CA, US)

- 출원인 : PolyPlus Battery Company(Berkeley, CA, US)
 - 초록 : Disclosed are ionically conductive membranes for protection of active metal anodes and methods for their fabrication. The membranes may be incorporated in active metal negative electrode (anode) structures and battery cells. In accordance with the invention, the membrane has the desired properties of high overall ionic conductivity and chemical stability towards the anode, the cathode and ambient conditions encountered in battery manufacturing. The membrane is capable of protecting an active metal anode from deleterious reaction with other battery components or ambient conditions while providing a high level of ionic conductivity to facilitate manufacture and/or enhance performance of a battery cell in which the membrane is incorporated.
- **High purity, high pressure hydrogen production with in-situ CO**
- 등록번호 : 7837975
 - 발명자 : Iyer, Mahesh V.(Houston, TX, US),
Fan, Liang-Shih(Columbus, OH, US),
Ramkumar, Shwetha(Columbus, OH, US)
 - 출원인 : The Ohio State University(Columbus, OH, US)
 - 초록 : A process for producing hydrogen, comprising the steps of: (a) gasifying a fuel into a raw synthesis gas comprising CO, hydrogen, steam and sulfur and halide contaminants in the form of H₂S, COS and HX, where X is a halide; (b) passing the raw synthesis gas through a water gas shift reactor (WGSR) into which CaO and steam are injected, the CaO reacting with the shifted gas to remove CO₂, sulfur and halides in a solid-phase calcium-containing product comprising CaCO₃, CaS and CaX₂; (c) separating the solid-phase calcium-

containing product from an enriched gaseous hydrogen product; and (d) regenerating the CaO by calcining the solid-phase calcium-containing product at a condition selected from the group consisting of: in the presence of steam, in the presence of CO₂, in the presence of synthesis gas, in the presence of H₂ and O₂, under partial vacuum, and combinations thereof. The CaO may have a surface area of at least 12.0 m²/g and a pore volume of at least 0.015 cm³/g, the CaO having a sorption capacity of at least about 70 grams of CO₂ per kilogram of CaO.

■ **Visbreaking yield enhancement by ultrafiltration**

- 등록번호 : 7837879
- 발명자 : Leta, Daniel P.(Flemington, NJ, US),
Brown, Leo D.(Baton Rouge, LA, US)
- 출원인 : ExxonMobil Research & Engineering Company(Annandale, NJ, US)
- 초록 : Ultrafiltration may be effectively used to produce visbreaker feeds of improved quality which enable the visbreaker to be operated at higher severity with higher yields of distillable products. A heavy oil feed stream is separated by ultrafiltration or membrane separation into a permeate fraction and a retentate fraction by contacting the heavy oil feed with the first side of a porous membrane separation element in a membrane separation zone. The permeate fraction, comprised of materials which pass selectively through the porous membrane element, is retrieved and at least a portion of it is subjected to visbreaking with the improved liquid yield, especially of lighter distillate fractions. The retentate fraction can be retrieved from the first side of the porous membrane and can also be subjected to visbreaking.

■ **Hydrogen generator and method for the production of hydrogen**

- 등록번호 : 7837842
- 발명자 : Mayers, Sr., Fred T.(P.O. Box 9405, Chester, VA, US), Mayers, Jr., Fred T.(P.O. Box 9405, Chester, VA, US)
- 출원인 : -
- 초록 : An apparatus and method for generating hydrogen. The hydrogen generator includes a cylindrical body and two end plates defining a cavity therein. A plurality of elements are disposed within the cavity including an outer and inner gaskets, an outer and inner electrodes, and a proton exchange membrane. A bladder inflated within the cavity compresses the elements together and into firm contact with the inner wall of the body. A plurality of elongated bolts compresses the end plates against the ends of the cylindrical body. The hydrogen generator includes a water inlet port, an oxygen and water outlet port, and a hydrogen port extending. Connecting a DC voltage across the electrodes and pumping distilled water into the water inlet port produces hydrogen gas that can be used to fuel an internal combustion engine or a fuel cell.

■ Method of manufacturing membrane-electrode assembly for fuel cell

- 등록번호 : 7837819
- 발명자 : Lee, Ki Sub(Seoul, KR), Kim, Young Soo(Gyeonggi-do, KR)
- 출원인 : Hyundai Motor Company(Seoul, KR)
- 초록 : The present invention provides a method of manufacturing a membrane-electrode assembly for a fuel cell, in which a binder is spray-coated on a surface of a polymer film, a catalyst slurry is bar-coated on a surface of an electrolyte membrane, bonded on the binder, to form a catalyst electrode layer, a bonded assembly of the electrolyte membrane and the catalyst electrode layer is separated from the polymer film, after a drying process, to obtain a 2-layer MEA, and the thus obtained 2-layer

MEAs are used to form a 3-layer MEA or a 5-layer MEA by a hot pressing process. Accordingly, the present methods solve the problems associated with prior art that the loss of catalyst is considerable, since the catalyst slurry is directly spray-coated on the membrane, and the catalyst electrode layer in a solid phase is hot-pressed on both surfaces of the membrane.

■ Polysulfone type selectively permeable hollow fiber membrane module and process for manufacturing the same

- 등록번호 : 7837042
- 발명자 : Yokota, Hideyuki(Otsu, JP), Mabuchi, Kimihiro(Otsu, JP), Monden, Noriko(Otsu, JP), Kato, Noriaki(Otsu, JP), Hatakeyama, Yuuki(Osaka, JP), Sunohara, Takashi (Osaka, JP), Masuda, Toshiaki (Osaka, JP)
- 출원인 : Nipro Corporation(Osaka-shi, JP)
- 초록 : The invention relates to a hollow fiber membrane module comprising polysulfone type selectively permeable hollow fiber membranes which contain a polysulfone-based resin and a hydrophilic polymer as main components, wherein (A) the content of the hydrophilic polymer in the uppermost layer of the inner surface of the hollow fiber membrane is at least 1.1 times larger than the content of the hydrophilic polymer in the proximate layer of the inner surface of the membrane, and (B) the content of the hydrophilic polymer in the uppermost layer of the outer surface of the hollow fiber membrane is at least 1.1 times larger than the content of the hydrophilic polymer in the uppermost layer of the inner surface of the membrane. The hollow fiber membrane module is exposed to a radioactive ray, on condition that the oxygen concentration of an ambient atmosphere around the hollow fiber membrane is from 0.001 to 0.1%, and that the moisture content of the hollow fiber membrane to the weight thereof is from 0.2 to 7 mass %.

■ **Asymmetric polymer film, method for the production and utilization thereof**

- 등록번호 : 7834131
- 발명자 : Petersen, Joachim(Flieden, DE), Baurmeister, Jochen(Eppstein, DE), Uensal, Oemer(Mainz, DE), Jordt, Frauke(Eppstein, DE), Kiefer, Joachim(Losheim am See, DE)
- 출원인 : BASF Fuel Cell GmbH(Frankfurt, DE)
- 초록 : The present invention relates to an asymmetric polymer film, in particular based on polazoles, a method for the production of the same and its use. The polyazole-based asymmetric polymer film according to the invention has a smooth and a rough side and enables, on account of its asymmetric structure, rapid and homogeneous doping with acids to form a proton-conducting membrane. The polyazole-based asymmetric polymer film according to the invention can be used in diverse ways on account of its excellent chemical, thermal and mechanical properties and is particularly suitable for the production of polymer electrolyte membranes (PEM) for so-called PEM fuel cells.

■ **Selectively permeable membranes on porous substrates**

- 등록번호 : 7833805
- 발명자 : Cuppoletti, John(Cincinnati, OH, US)
- 출원인 : University of Cincinnati(Cincinnati, OH, US)
- 초록 : Functional biological synthetic composite (BSC) membranes comprising phospholipids, biological membrane proteins and porous supports or membranes are provided. Lipid bilayers are formed on porous polycarbonate (PC), polyethylene terephthalate (PETE) and poly (l-lactic acid) (PLLA) membranes and in laser-drilled pores in a multi-well plastic plate as measured by increased resistance or decreased currents. BSC's com-

prising functional reconstituted Kv1.5 K channel and/or H/K ATPase transport proteins are also provided c inhibitor), methods of manufacture, and high throughput screening assays employing the inventive membranes are also provided.

■ **Proton exchange membrane fuel cell and method of forming a fuel cell**

- 등록번호 : 7833645
- 발명자 : Fuglevand, William A.(Spokane, WA, US), Bayyuk, Shibli Hanna I.(Spokane, WA, US), Wright, Matthew M.(Spokane, WA, US)
- 출원인 : ReliOn, Inc.(Spokane, WA, US)
- 초록 : A proton exchange membrane fuel cell and method for forming a fuel cell is disclosed and which includes, in its broadest aspect, a proton exchange membrane having opposite anode and cathode sides; and individual electrodes juxtaposed relative to each of the anode and cathode sides, and wherein at least one of the electrodes is fabricated, at least in part, of a porous, electrically conductive ceramic material. The present methodology, as disclosed, includes the steps of providing a pair of electrically conductive ceramic substrates, applying a catalyst coating to the inside facing surface thereof; and providing a polymeric proton exchange membrane, and positioning the polymeric proton membrane therebetween, and in ohmic electrical contact relative thereto to form a resulting PEM fuel cell.