최신 미국특허 등록 목록

■ **Method and apparatus for examining ion-conductive electrolyte membrane**

- 등록번호: 8,358,137
- 발명자: Uchiyama; Naoki (Hamamatsu, JP)
- 출원인: Kabushiki Kaisha Atsumitec (Shizuoka, JP)
- 초록: A detection membrane is joined to a first surface of an electrolyte membrane. After the detection membrane is hydrogenated, oxygen is supplied to a space facing a second surface of the electrolyte membrane. If the electrolyte membrane has a defect, oxygen leaks to the first surface, resulting in a change in resistance of the detection membrane owing to dehydrogenation of the detection membrane. The defect is recognized by this change. An air electrode is joined to the second surface, and an electric circuit is connected between the detection membrane and the air electrode. After hydrogenating the detection membrane and ionizing oxygen supplied to a space facing the air electrode, oxygen ions permeate through the electrolyte membrane and dehydrogenate the detection membrane. Uniformity of the oxygen ion conductivity is examined by measuring resistance of the detection membrane, which varies depending on the amount of oxygen ions, for each region.

■ **Membrane, especially for an optical device having a deformable membrane**

- 등록번호: 8,363,330
- 발명자: Bolis; Sebastien (Crolles, FR), Barbe; Jean-Charles (Izeron, FR), Charvet; Pierre-Louis (Saint Marin le Vinoux, FR)
- 출원인: Commissariat a l'Energie Atomique (Paris, FR)
- 초록: An optical device having a deformable membrane comprising a flexible film having at least one peripheral anchoring zone, a central zone and an intermediate zone between the central zone and the anchoring zone. The membrane also includes one or more movable parts of electrostatic actuating means, each movable part being formed from a leg terminating on one side in a foot mechanically fastened to a film-fastening region located in the intermediate zone and terminating on the other side in a free end. The legs incorporate a movable electrode, the free end having to be attracted by a fixed electrode of the actuating means. The free end is placed facing the free end so as to deform at least the central zone of the membrane.

■ **Method for fabricating membrane having hydrophilicity and hydrophobicity**

- 등록번호: 8,372,297
- 발명자: Lee; Chang-woo (Gyeongsangbuk-do, KR), Kim; Dong-seob (Gyeongsangbuk-do, KR), Wei; Sun (Philadelphia, PA), Hwang; Woon-bong (Gyeongsangbuk-do, KR)
- 출원인: Postech Academy-Industry Foundation (Pohang, KR)
- 초록: A method for fabricating a membrane is disclosed, to provide both hydrophilicity and

hydrophobicity to predetermined positions of a surface of a single membrane. The method for fabricating a membrane includes: preparing a template with nano-scale holes formed on its outer surface; coating a polymer material on a predetermined pattern region of the outer surface of the template; attaching a hydrophilic film on the outer surface of the template; and removing the template from the hydrophilic film.

■ **Sulfonated block copolymer fluid composition for preparing membranes and membrane structures**

- 등록번호: 8,377,514
- 발명자: Handlin, Jr.; Dale Lee (Houston, TX), Trenor; Scott Russell (Houston, TX), Dado; Gregory Paul (Chicago, IL)
- 출원인: Kraton Polymers US LLC (Houston, TX)
- 초록: The present invention relates to an improved method for making sulfonated block copolymers and to methods for making membranes from such block copolymers. In particular, the present invention relates to an improved method for making sulfonated block copolymers having at least two polymer end blocks that are resistant to sulfonation and at least one polymer interior block that is susceptible to sulfonation where the sulfonation agent is C.sub.2 to C.sub.8 acyl sulfate. In the improved process the residual carboxylic acid formed from the C.sub.2 to C.sub.8 acyl sulfate is converted to C.sub.1 to C.sub.4 alkyl esters by contacting the residual carboxylic acid with at least a 0.9:1 molar ratio of a C.sub.1 to C.sub.4 alcohol to residual carboxylic acid, resulting in an improved sulfonated block copolymer solution. The present invention further relates to the use of such sulfonated block copolymer solutions to prepare various membranes and other articles.

■ **Method for production of DDR type zeolite membrane**

- 등록번호: 8,377,838
- 발명자: Uchikawa; Tetsuya (Nagoya, JP), Yajima; Kenji (Nagoya, JP), Nonaka; Hisayoshi (Nagoya, JP), Tomita; Toshihiro (Nagoya, JP)
- 출원인: NGK Insulators, Ltd. (Nagoya, JP)
- 초록: A method is provided for producing a DDR type zeolite membrane, including a membrane formation step of immersing a porous substrate having a DDR type zeolite seed crystal adhered thereon, in a raw material solution containing 1-adamantaneamine, silica (SiO.sub.2) and water, and conducting a hydrothermal synthesis of DDR type zeolite to form a 1-adamantaneamine-containing DDR type zeolite membrane on the porous substrate to produce a precursor of DDR type zeolite membrane-containing body, and a burning step of heating the precursor at 400.degree. C. or above and at 550.degree. C. or below to burn and remove the 1-adamantaneamine contained in the DDR type zeolite membrane.

■ **Asymmetric membrane cMUT devices and fabrication methods**

- 등록번호: 8,372,011
- 발명자: Degertekin; F. Levent (Decatur, GA)
- 출원인: Georgia Tech Research Corporation (Atlanta, GA)
- 초록: Asymmetric membrane capacitive micromachined ultrasonic transducer ("cMUT") devices and fabrication methods are provided. In a preferred embodiment, a cMUT device according to the present invention generally comprises a membrane having asymmetric properties. The membrane can have a varied width across its length so that its ends have different widths. The asymmetric membrane can have varied flex characteristics due to its varied width dimensions. In another preferred embodiment, a

cMUT device according to the present invention generally comprises an electrode element having asymmetric properties. The electrode element can have a varied width across its length so that its ends have different widths. The asymmetric electrode element can have different reception and transmission characteristics due to its varied width dimensions. In another preferred embodiment, a mass load positioned along the membrane can alter the mass distribution of the membrane. Other embodiments are also claimed and described.

■ **Gas-selective membrane and method of its production**

- 등록번호: 8,361,196
- 발명자: Schwartz; Vladimir (Lexington, MA), Wetzig; Daniel (Cologne, DE), Chernobrod; Boris (Santa Fe, NM), Bley; Werner Grosse (Bonn, DE)
- 출원인: Inficon GmbH (Bad Ragaz, CH)
- 초록: A membrane selectively permeable to light gases comprises a membrane body formed by a first plate and a second plate. The second plate comprises a thin layer that is selectively gas-permeable. In the region of windows, this layer is exposed. There, support is provided by a porous bottom wall in the first plate or by narrow bores in the second plate. A heating device causes a radiation heating of the windows.

■ **Porous carbon structure, method for preparing same, electrode catalyst for fuel cell, and electrode and membrane-electrode assembly including same**

- 등록번호: 8,361,663
- 발명자: Kang; Soon-Ki (Suwon-si, KR), Chai; Geun-Seok (Suwon-si, KR), Min; Myoung-Ki (Suwon-si, KR), Kwak; Chan (Suwon-si, KR), Alexandrovichserov; Alexey (Suwon-si, KR)
- 출원인: Samsung SDI Co., Ltd. (Gongse-dong, Gibeung-gu, Yongin-si, Gyeonggi-do, KR)
- 초록: Porous carbon structure, method for preparing same, electrode catalyst for fuel cell, and electrode and membrane-electrode assembly including same.

■ **Integrated membrane and adsorption system for carbon dioxide removal from natural gas**

- 등록번호: 8,388,732
- 발명자: Doong; Shain-Jer (Kildeer, IL), Zhou; Lubo (Inverness, IL), Bellville; Dennis J. (Deer Park, IL), Schott; Mark E. (Palatine, IL), Bresler; Leonid (Northbrook, IL), Foresman; John M. (Homer Glen, IL)
- 출원인: UOP LLC (Des Plaines, IL)
- 초록: The present invention relates to an integrated membrane/adsorbent process and system for removal of carbon dioxide from natural gas on a ship that houses natural gas purification equipment. Additional membrane units or adsorbent beds are used to reduce the amount of product gas that is lost in gas streams that are used to regenerate the adsorbent beds. These systems produce a product stream that meets the specifications of less than 50 parts per million carbon dioxide in natural gas for liquefaction.

■ **Modified hyper-branched polymer and proton exchange membrane applied with the same, and method for manufacturing the proton exchange membrane**

- 등록번호: 8,389,639

• 발명자: Chang; Chung-Liang (Hsinchu, TW), Hsu; Ya-Ting (Bade, TW), Pan; Jing-Pin (Zhudong Town, Hsinchu County, TW)

• 출원인: Industrial Technology Research Institute (Hsinchu, TW)

• 초록: A proton exchange membrane comprising modified hyper-branched polymer is disclosed. The proton exchange membrane includes 85-90 wt % of sulfonated tetrafluorethylene copolymer and 15-10 wt % of modified hyper-branched polymer. The modified hyper-branched polymer comprises the bismaleimide (BMI)-based hyper-branched polymer, and parts of the chain ends of the hyper-branched polymer are sulfonated by the sulfonic compound. Also, the modified hyper-branched polymer and sulfonated tetra-fluorethylene copolymer are interpenetrated to form an interpenetrating polymer. Furthermore, the modification step could be performed before or after forming the interpenetrating polymer. For example, the sulfonation is proceeded after forming the interpenetrating polymer. Alternatively, the sulfonation of the hyper-branched polymer could be proceeded before the formation of the interpenetrating polymer.

■ Polyimide gas separation membrane and gas separation method

• 등록번호: 8,394,176

• 발명자: Kanougi; Tomonori (Chiba, JP), Hoshino; Harutoshi (Chiba, JP), Yoshinaga; Toshimune (Chiba, JP), Kase; Yoji (Chiba, JP), Fukunaga; Kenji (Chiba, JP)

• 출원인: Ube Industries, Ltd. (Yamaguchi, JP)

• 초록: Disclosed are a gas separation membrane and a gas separation method in which at least one species of organic vapor is separated and recovered from an organic vapor mixture using the gas separation membrane. The gas separation membrane is made of an aromatic polyimide composed of a tetracarboxylic acid component consisting of an aromatic ring-containing tetracarboxylic acid and a diamine component comprising 10 to 90 mol % of a combination of (B1) 3,4'-diaminodiphenyl ether and (B2) 4,4'-diaminodiphenyl ether at a B1 to B2 molar ratio, B1/B2, ranging from 10/1 to 1/10, and 10 to 90 mol % of other aromatic diamine.

■ Nonwoven fabric and electrolyte membrane

• 등록번호: 8,394,549

• 발명자: Terada; Ichiro (Tokyo, JP), Kotera; Seigo (Tokyo, JP), Hamazaki; Kazuo (Tokyo, JP), Aida; Shigeru (Tokyo, JP), Iruya; Ken (Tokyo, JP)

• 출원인: Asahi Glass Company, Limited (Tokyo, JP)

• 초록: To obtain a nonwoven fabric which is excellent in the heat resistance and the chemical resistance, of which the fiber diameter is small, and which is excellent in the mechanical strength at a temperature at which it is used; and an electrolyte membrane which is excellent in the dimensional stability when it is swollen by water, and of which an increase in the resistance by a reinforcing material is suppressed. A nonwoven fabric 28 containing fibers 26 of an ethylene/tetrafluoroethylene copolymer having a storage elastic modulus E' at 25.degree. C. of at least 8.times.10.sup.8 Pa and a melt viscosity measured at 300.degree. C. of higher than 60 Pas and at most 300 Pas, wherein the average fiber diameter of the fibers is from 0.01 to 3 .mu.m; and an electrolyte membrane reinforced by the nonwoven fabric 28.

■ Membrane-electrode assembly for direct oxidation fuel cell and direct oxidation fuel cell

• 등록번호: 8,399,144

• 발명자: Ueda; Hideyuki (Osaka, JP), Matsuda; Hiroaki (Osaka, JP), Akiyama; Takashi

(Osaka, JP)

- 출원인: Panasonic Corporation (Osaka, JP)
- 초록: A membrane-electrode assembly for a direct oxidation fuel cell includes an electrolyte membrane, and an anode and a cathode sandwiching said electrolyte membrane. The cathode includes a catalyst layer in contact with the electrolyte membrane and a diffusion layer formed on the catalyst layer, and the catalyst layer contains 2 to 20% by volume of pores. A direct oxidation fuel cell including this membrane-electrode assembly has excellent power generating performance and durability.

■ **Method for producing an anion-exchange membrane for a solid polymer electrolyte type fuel cell**

- 등록번호: 8,399,154
- 발명자: Fukuta; Kenji (Tsukuba, JP), Watanabe; Shin (Tsukuba, JP), Yanagi; Hiroyuki (Tsukuba, JP)
- 출원인: Tokuyama Corporation (Yamaguchi, JP)
- 초록: An anion-exchange membrane having quaternary ammonium groups or quaternary phosphonium groups wherein halogen ions serve as the counter ions is obtained. Rather than being subjected to ion exchange with an OH-type membrane using a toxic substance such as sodium hydroxide, the halogen-type anion exchange membrane is brought into contact with a carbonate solution and/or bicarbonate solution to directly obtain an anion exchange membrane where at least some of the counterions of the quaternary ammonium groups or quaternary phosphonium groups are CO.sub.3.sup.2- and/or HCO.sub.3.sup.-.

■ **Free-standing membrane electrolyte electrode assembly**

- 등록번호: 8,399,146
- 발명자: Higuchi; Yoshikatsu (Wako, JP), Saito; Yuji (Wako, JP), Komiya; Teruaki (Wako, JP), Harada; Ushio (Wako, JP)
- 출원인: Honda Motor Co., Ltd. (Tokyo, JP)
- 초록: A free-standing membrane electrolyte electrode assembly (ESC) comprises an electrolyte, an anode electrode formed at one end face of the electrolyte, and a cathode electrode formed at the other. The electrolyte is a single crystal having a surface along with oxide ions move or a direction in which the ions move or a polycrystal oriented along a surface along which oxide ions move or in a direction in which the ions move. The surface or the direction is parallel to the thickness direction. The thickness of the electrolyte is 50 to 800 .mu.m and the quotient of the division of the total thickness of the anode electrode and the cathode electrode by the thickness of the electrolyte is 0.1 or less,. The thickness of the ESC is 1 mm or less.

■ **Conjugates and processes for their preparation and their use for transporting molecules across biological membranes**

- 등록번호: 08420396
- 발명자: Eugene Uhlmann (DE), Beate Greiner (DE), Eberhard Unger (DE), Gislinde Gothe (DE), Marc Schwerdel (DE)
- 출원인: Eugene Uhlmann (DE), Beate Greiner (DE), Eberhard Unger (DE), Gislinde Gothe (DE), Marc Schwerdel (DE)
- 초록: The present invention provides conjugates, processes for their preparation, and the use of these conjugates for transporting low-molecular-weight compounds and macromolecules across biological membranes,

in particular for transporting molecules into cells. The present invention also provides pharmaceutical compositions, diagnostic aids, and test kits in which these conjugates are present or used.

■ **Continuous ejection system including compliant membrane transducer**

- 등록번호: 08398210
- 발명자: Michael F. Baumer (US), James D. Huffman (US), Hrishikesh V. Panchawagh (US), Jeremy M. Grace (US), Yonglin Xie (US), Qing Yang (US), David P. Trauernicht (US), John A. Lebens (US)
- 출원인: Michael F. Baumer (US), James D. Huffman (US), Hrishikesh V. Panchawagh (US), Jeremy M. Grace (US), Yonglin Xie (US), Qing Yang (US), David P. Trauernicht (US), John A. Lebens (US)
- 초록: A continuous liquid ejection system includes a substrate defining a liquid chamber. An orifice plate, affixed to the substrate, includes a MEMS transducing member. The MEMS transducing member includes a first portion anchored to the substrate and a second portion extending over and free to move relative to the liquid chamber. A compliant membrane, positioned in contact with the MEMS transducing member, includes an orifice and a first portion covering the MEMS transducing member and a second portion anchored to the substrate. A liquid supply provides a liquid to the liquid chamber under a pressure sufficient to eject a continuous jet of the liquid through the orifice located in the compliant membrane. The MEMS transducing member is selectively actuated to cause a portion of the compliant membrane to be displaced relative to the liquid chamber to cause a drop of liquid to break off from the liquid jet.

■ **Electrolyte membrane with anisotopic swelling and aligned filler**

- 등록번호: 08415071
- 발명자: Shiro Tanaka (JP), Hiroshi Tabata (JP), Shuguo Zhang (JP)
- 출원인: Shiro Tanaka (JP), Hiroshi Tabata (JP), Shuguo Zhang (JP)
- 초록: An electrolyte membrane (11) includes: a filler (20); and a polymer electrolyte (22). A thickness of the electrolyte membrane (11) is 1 micrometer to 500 micrometer, a moisture content thereof is 10 mass % or more, and a ratio of a swelling ratio in a membrane surface direction (xy) thereof and a swelling ratio in a membrane thickness direction (z) thereof satisfies following Expression 1: where Lambda z is the swelling ratio in the membrane thickness direction (z), and Lambda xy is the swelling ratio in the membrane surface direction (xy).

$$\lambda_{xy} \quad \lambda_{z} < 0.3 \text{ [Math. 1]}$$

■ **Electrolyte, production process therefor, electrolyte membrane, production process therefor, catalyst layer and fuel cell**

- 등록번호: 08440365
- 발명자: Naohiro Hoshikawa (JP), Naoki Hasegawa (JP), Yoichi Hosokawa (JP), Masaya Kawasumi (JP), Akihiro Shinohara (JP), Hiromitsu Tanaka (JP), Masayoshi Takami (JP), Toshihiko Yoshida (JP)
- 출원인: Naohiro Hoshikawa (JP), Naoki Hasegawa (JP), Yoichi Hosokawa (JP), Masaya Kawasumi (JP), Akihiro Shinohara (JP), Hiromitsu Tanaka (JP), Masayoshi Takami (JP), Toshihiko Yoshida (JP)
- 초록: An electrolyte having a structure where a

fluorinated hydrophilic segment A represented by $-E_2-[Rf-E_1]_m-$ and a hydrocarbon hydrophobic segment B are alternately bonded to each other through chemical bond and a production process therefor, and an electrolyte membrane, a production process therefor, a catalyst layer and a fuel cell using the same. Rf is a linear or a branched perfluoro chain having one or more carbon atoms, E1, and E2 are each a proton conductive portion represented by Formula $-(CONM)_{i1}(CO)_{i2}(SO_2NM)_{i3}(SO_2)_{i4}-$ ($0 \leqq i_1$, $0 \leqq i_2 \leqq 1$, $0 \leqq i_3$, $0 \leqq i_4 \leqq 1$, $01+i_3$, i_1 to i_4 are each an integer, and M is proton, alkali metal, or alkali earth metal), $2 \leqq m$ (m is an integer), and Rf, E_1, and E_2 may be each arbitrarily selected in the repeating unit.

■ **Electronic connector having a clamping member urging a flow cell toward an electrical circuitry with an electrically conductive membrane disposed in between**

- 등록번호: 08398418
- 발명자: John Nobile (US), George Roth (US), David Marran (US), William Mileski (US)
- 출원인: John Nobile (US), George Roth (US), David Marran (US), William Mileski (US)
- 초록: A leak resistant electrical connector configured as a fluidic barrier between a fluidics device, which may comprise a chemFET sensor, and other electrical circuitry wherein the fluidics device further comprises one or more electrical contacts conductively coupled to one or more electrical contacts associated with the electrical circuitry through the connector.

■ **Force, pressure, or stiffness measurement or calibration using graphene or other sheet membrane**

- 등록번호: 08418547
- 발명자: Jeffrey William Kysar (US), James C. Hone (US), Changgu Lee (US), Xiaoding Wei (US)
- 출원인: Jeffrey William Kysar (US), James C. Hone (US), Changgu Lee (US), Xiaoding Wei (US)
- 초록: Force, pressure, or stiffness measurement or calibration can be provided, such as by using a graphene or other sheet membrane, which can provide a specified number of monolayers suspended over a substantially circular well. In an example, the apparatus can include a substrate, including a substantially circular well. A deformable sheet membrane can be suspended over the well. The membrane can be configured to include a specified integer number of one or more monolayers. A storage medium can comprise accompanying information about the suspended membrane or the substrate that, with a deflection displacement response of the suspended membrane to an applied force or pressure, provides a measurement of the applied force or pressure.

■ **Graphene-based structure, method of suspending graphene membrane, and method of depositing material onto graphene membrane**

- 등록번호: 08409450
- 발명자: Alexander K. Zettl (US), Jannik Christian Meyer (DE)
- 출원인: Alexander K. Zettl (US), Jannik Christian Meyer (DE)
- 초록: An embodiment of a method of suspending a graphene membrane across a gap in a support structure includes attaching graphene to a substrate. A pre-fabricated support structure having the gap is attached to the graphene. The graphene and the pre-

fabricated support structure are then separated from the substrate which leaves the graphene membrane suspended across the gap in the pre-fabricated support structure. An embodiment of a method of depositing material includes placing a support structure having a graphene membrane suspended across a gap under vacuum. A precursor is adsorbed to a surface of the graphene membrane. A portion of the graphene membrane is exposed to a focused electron beam which deposits a material from the precursor onto the graphene membrane. An embodiment of a graphene-based structure includes a support structure having a gap, a graphene membrane suspended across the gap, and a material deposited in a pattern on the graphene membrane.

■ Humidifying membrane module

- 등록번호: 08414693
- 발명자: Takayuki Takagi (JP)
- 출원인: Takayuki Takagi (JP)
- 초록: To provide a humidifying membrane module that is reduced in weight, size and cost by making a case in a single layer structure, the humidifying membrane module has a hollow fiber membrane bundle constructed from plural hollow fiber membranes, a case accommodating the hollow fiber membrane bundle, a first flow passage extending through hollows of the hollow fiber membranes, and a second flow passage extending through the outer surface sides of the hollow fiber membranes, the membrane bundle and the case are simultaneously integrated at both ends of the membrane bundle by using potting members sealing gaps between the membrane bundle and the case, an inlet and an outlet constructing the first flow passage are formed at the both ends of the case respectively, and an entrance and an exit constructing the second flow passage are formed in side surfaces near the both ends of the case respectively.

■ Method for producing an anion-exchange membrane for a solid polymer electrolyte type fuel cell

- 등록번호: 08399154
- 발명자: Kenji Fukuta (JP), Shin Watanabe (JP), Hiroyuki Yanagi (JP)
- 출원인: Kenji Fukuta (JP), Shin Watanabe (JP), Hiroyuki Yanagi (JP)
- 초록: An anion-exchange membrane having quaternary ammonium groups or quaternary phosphonium groups wherein halogen ions serve as the counter ions is obtained. Rather than being subjected to ion exchange with an OH-type membrane using a toxic substance such as sodium hydroxide, the halogen-type anion exchange membrane is brought into contact with a carbonate solution and/or bicarbonate solution to directly obtain an anion exchange membrane where at least some of the counterions of the quaternary ammonium groups or quaternary phosphonium groups are CO_3^{2-} and/or HCO_3^-.

■ Method for selective electrofusion of at least two fusion partners having cell-like membranes

- 등록번호: 08426205
- 발명자: Peter Eriksson (SE), Daniel T. Chiu (US), Alexander Moscho (DE), Owe Orwar (SE), Richard N. Zare (US)
- 출원인: Peter Eriksson (SE), Daniel T. Chiu (US), Alexander Moscho (DE), Owe Orwar (SE), Richard N. Zare (US)
- 초록: Disclosed is a method for selective electrofusion of at least two fusion partners having cell-like membranes and cellular or subcellular dimensions, comprising the following steps: A) the fusion partners are brought into contact with each other and B) an electrical

field of a strength sufficient to obtain fusion and highly focused on the fusion partners is applied. The fusion partners are independently selected from the group consisting of a single cell, a liposome, a proteoliposome, a synthetic vesicle, an egg cell, an enucleated egg cell, a sperm cell at any development stage and a plant protoplast.

■ **Method of membrane separation and membrane separation apparatus**

- 등록번호: 08404119
- 발명자: Masashi Echizen (JP), Takuji Shintani (JP), Naoki Kurata (JP), Kouji Maruyama (JP)
- 출원인: Masashi Echizen (JP), Takuji Shintani (JP), Naoki Kurata (JP), Kouji Maruyama (JP)
- 초록: A method of membrane separation and membrane separation apparatus, with which not only a supply liquid can be evaluated but also the problems, such as scale, occurring on reverse osmosis membrane can be monitored in a highly straightforward fashion. There is provided a membrane separation apparatus equipped with reverse osmosis membrane module (3) so as to be adapted for feeding of a supply liquid and obtaining of a permeated liquid and a concentrated liquid, characterized by comprising a feeding-side membrane separation means (10) which includes a separation membrane (11) of which the membrane face (11a) can be monitored and guides the supply liquid so as to separate the membrane, and a concentrating-side membrane separation means (20) which includes a separation membrane (21) of which the membrane face (21a) can be monitored and guides the concentrated liquid so as to separate the membrane separation thereof.

■ **Solid polymer electrolyte fuel cell membrane with anion exchange membrane**

- 등록번호: 08440366
- 발명자: Kenji Fukuta (JP), Takenori Isomura (JP), Hiroyuki Yanagi (JP)
- 출원인: Kenji Fukuta (JP), Takenori Isomura (JP), Hiroyuki Yanagi (JP)
- 초록: Disclosed is a solid polymer electrolyte fuel cell membrane comprising an anion exchange membrane that contains a hydrocarbon-based anion exchange resin, wherein the water permeability at 25° C. is 1400 g m-2 hr-1 or greater, the anion exchange capacity is 0.2 to 5.0 mmol · g-1, the percentage of water content at 25° C. is 7% by weight or greater, and the thickness is 3 to 50 μm. It is especially preferable as a solid polymer electrolyte fuel cell membrane when said anion exchange membrane is an ion exchange membrane with a 5 to 15 μm-thick porous membrane substrate, wherein the voids in said porous membrane are filled with a hydrocarbon-based anion exchange resin.

■ **Polybenzoxazine-based compound, electrolyte membrane including the same, and fuel cell employing the electrolyte membrane**

- 등록번호: 08426081
- 발명자: Seong-woo Choi (KR), Hee-young Sun (KR), Myung-jin Lee (KR), Woo-sung Jeon (KR)
- 출원인: Seong-woo Choi (KR), Hee-young Sun (KR), Myung-jin Lee (KR), Woo-sung Jeon (KR)
- 초록: A method of preparing an electrolyte membrane comprising a crosslinked object of a polybenzoxazine-based compound formed of a polymerized resultant product of a first monofunctional benzoxazine-based monomer or a second benzoxazine-based monomer

multifunctional benzoxazine-based monomer with a crosslinkable compound.

■ **Method and morphologically adaptable apparatus for altering the charge distribution upon living membranes with functional stabilization of the membrane physical electrical integrity**

- 등록번호: 08415070
- 발명자: Amy Qi Han (US)
- 출원인: Amy Qi Han (US)
- 초록: Ionic polymers are made from selected partially fluorinated dienes, in which the repeat units are cycloaliphatic. The polymers are formed into membranes.

■ **Photocuable thiol-ene low gas permeability membranes**

- 등록번호: 08440736
- 발명자: Charles E. Hoyle (US), Sergei Nazarenko (US), Huanyu Wei (US)
- 출원인: Charles E. Hoyle (US), Sergei Nazarenko (US), Huanyu Wei (US)
- 초록: The present invention provides modified multifunctional thiol-ene monomers wherein one or more thiols are reacted with a Michael addition reactive double bond compound. The present invention further discloses photocurable thiol-ene formulations comprising thiol-ene monomers including the modified multifunctional thiols. The present invention further discloses photocurable thiol-ene formulations comprising thiol-ene monomers and Michael addition reactive double bond molecules and a Michael catalyst. The formulations of the present invention can be photocured to make films or coatings. In a further disclosure, the formulations, including those comprised of unmodified multifunctional thiols and multifunctional enes, are photocured to form films applied to non-flexible or flexible polymer or non-polymer substrates suitable for food packaging, electronic products, optical products and other applications and free-standing films. The present invention further discloses photocurable thiol-ene formulations comprising thiol-ene monomers and Michael addition reactive double bond molecules and a Michael catalyst. These formulations are disclosed to form free-standing films and coatings on substrates when applied to flexible substrates. Such materials are suitable for use in the packaging of food products and other products which are to be maintained in a hermetically sealed relationship to the atmosphere.

■ **Method for preparing hydrophilic polyethersulfone membrane**

- 등록번호: 08425814
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- 출원인: Michael Mezhirov (US), Eshan B. Yeh (US), Richard Sale (US)
- 초록: The present disclosure relates to improved efficient and effective systems and methods of manufacturing hydrophilic polyethersulfone (PES) membrane suitable for commercial applications and the resultant hydrophilic polyethersulfone (PES) membrane suitable for commercial applications produced thereby and includes methods of manufacturing hydrophilic polyethersulfone (PES) membrane comprising the acts of: providing hydrophobic PES membrane; prewetting the hydrophobic PES membrane in a sufficient amount of a liquid having a sufficiently low surface tension; exposing the wet hydrophobic PES membrane to a sufficient amount of an aqueous solution of oxidizer; and after the exposing act, heating the hydrophobic PES membrane for a sufficient time at a sufficient temperature and methods of manufacturing hydrophilic polyethersulfone (PES) membrane

comprising the acts of: providing gel PES membrane; exposing the gel PES membrane to a sufficient amount of an aqueous solution of oxidizer; and after the exposing act, heating the hydrophobic PES membrane for a sufficient time at a sufficient temperature and the resulting products.

■ Anion exchange membrane

• 등록번호: 08436057

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• 초록: An anion exchange membrane and fuel cell incorporating the anion exchange membrane are detailed in which proazaphosphatrane and azaphosphatrane cations are covalently bonded to a sulfonated fluoropolymer support along with anionic counterions. A positive charge is dispersed in the aforementioned cations which are buried in the support to reduce the cation-anion interactions and increase the mobility of hydroxide ions, for example, across the membrane. The anion exchange membrane has the ability to operate at high temperatures and in highly alkaline environments with high conductivity and low resistance.