

최신 미국특허 등록 목록

■ Polyelectrolyte composition for humidity sensor, polyelectrolyte ink and preparation method of polyelectrolyte membrane for sensor by inkjet printing

- 등록번호 : 7771620
- 발명자 : Chung, Kwang Choon(Seoul, KR), Gong, Myoung Seon(Seoul, KR), Shim, Jae Joon(Yongin-si, KR)
- 출원인 : Haeun Chemtec Co., Ltd(Kyungki-do, KR)
- 초록 : This invention relates to a polyelectrolyte composition for a humidity sensor, polyelectrolyte ink and a preparation method of a polyelectrolyte membrane for a humidity sensor by inkjet printing. The polyelectrolyte composition according to this invention is composed of polyelectrolyte, crosslinking agent and organic solvent comprising a single component or in the form of a mixture of two or more solvents such as alcohols. The object of this invention is to provide a polyelectrolyte composition and a polyelectrolyte ink composition suitable for humidity sensor and a preparation method for a reliable humidity sensor with uniform thickness achieved through inkjet printing.

■ Membrane filtration system

- 등록번호 : 7767068
- 발명자 : Yoneda, Tsuyoshi(Matsuyama, JP), Manabe, Atsuyuki(Matsuyama, JP)
- 출원인 : Miura Co., Ltd.(Matsuyama-shi, JP)
- 초록 : The present invention provides a membrane filtration system (1) including: a filtering membrane portion (3) for removing impurities in feed water; a drain line (16) for draining a part of concentrate from the filtering membrane portion (3) to an exterior of a system; a concen-

trate return line (17) for returning a remainder of the concentrate from the filtering membrane portion (3) to an upstream side of the filtering membrane portion (3); a return flow rate adjusting portion (28) for concentrate provided in the concentrate return line (17); and a control portion (30) controlling the return flow rate adjusting portion (28) based on a drain flow rate of the concentrate or a flow rate of product water from the filtering membrane portion (3). With this construction, it is possible to suppress wasteful power consumption in a feed pump (7) for feeding water to the filtering membrane portion (3) and to prevent clogging in the filtering membrane in the filtering membrane portion (3).

■ Heterogeneous membrane electrodes

- 등록번호 : 7713332
- 발명자 : Lauks, Imants(Ottawa, CA), Varlan, Anca(Nepean, CA), Oussova, Alexandra(Ottawa, CA), Bales, Michael(Ottawa, CA)
- 출원인 : Epocal Inc.(Ottawa, CA)
- 초록 : The present invention relates to planar electrochemical sensors with membrane coatings used to perform chemical analyses. The object of this invention is to provide unit-use disposable sensors of very simple and inexpensive construction, preferably with only a single membrane coating on an electrode. The invented devices are potentiometric salt-bridge reference electrodes and dissolved gas sensors constructed with a heterogeneous membrane coating of a conductor. The heterogeneous membrane, which is an intimate admixture of a

hydrophobic and a hydrophilic compartment, concurrently supports constrained transport of non-volatile species through its hydrophilic compartment and rapid gas and water vapor transport through its hydrophobic compartment.

■ Ion exchange membrane electrolyzer

- 등록번호 : 7763152
- 발명자 : Suzuki, Minoru(Tamano, JP), Kameda, Masakazu(Tamano, JP)
- 출원인 : Chlorine Engineers Corp., Ltd.(Tokyo, JP), Tosoh Corporation(Shunan-shi, JP)
- 초록 : There is provided an ion exchange membrane electrolyzer, wherein at least one electrode is energized by coming into contact with plate spring bodies formed on the electrode side of an electrode holding member forming a space with an electrode chamber partition bonded to a plate-like electrode chamber partition by a strip-like bonded portion, the electrode has a connected portion extending from a plane parallel to the ion exchange membrane toward the electrode holding member side in a direction perpendicular to the electrode plane, the connected portion is provided with an engaging opening extending in a direction perpendicular to the electrode plane, and the engaging opening engages with an engaging member, permitting the electrode to move in a direction perpendicular to the electrode plane within the displacement range of the plate spring bodies.

■ Apparatus for producing hydrogen

- 등록번호 : 7763085
- 발명자 : Kenefake, Dean Alan(Sugar Land, TX, US), Wheat, William Spencer(Missouri City, TX, US), Sun, Hongqiao Bruce(Sugar Land, TX, US), Balasubramanian, Bhas-

kar(Houston, TX, US), Mirkovic, Vesna Radovan(Pearland, TX, US), Casey, Daniel Glenn(Kingwood, TX, US)

- 출원인 : Mitsubishi Materials Corporation(Tokyo, JP)

- 초록 : An apparatus and method for producing a hydrogen-enriched reformat. The apparatus includes a fuel processor for converting a fuel to a reformat having fluctuations in pressure and or flow rate, means for reducing the fluctuations, a compression unit for compressing the reformat and one or more of a purification unit and a storage unit downstream of a compression unit. Means for reducing the fluctuations in the reformat can include one or more of a buffer and a conduit for providing a controlled flow of a supplemental fluid to an inlet of the compression unit. The supplemental fluid can include the compressed reformat, a hydrogen-enriched reformat, and mixtures thereof. The apparatus can include means for regulating power to the compression unit that can incrementally increase power to the compression unit particularly during start up. The purification unit can include one or more of a hydrogen selective membrane and a pressure swing adsorption unit. Methods for producing hydrogen are also disclosed.

■ Multiblock copolymer, method of preparing the same, polymer electrolyte membrane prepared from the multiblock copolymer, method of preparing the polymer electrolyte membrane, and fuel cell employing the polymer electrolyte membrane

- 등록번호 : 7759453
- 발명자 : Kim, Hae-kyoung(Seoul, KR), Lee, Won-mok(Seoul, KR), Jung, Jin-chul(Seoul, KR), Chang, Hyuk(Seongnam-si, KR), Park, Sam-dae(Pohang-si, KR), Chang, Yoon-ju(Po-

hang-si, KR)

- 출원인 : Samsung SDI Co., Ltd.(Suwon-si, KR)
- 초록 : A multiblock copolymer includes a polysulfone repeating unit, a sulfonated polysulfone repeating unit and an ethylenic unsaturated group at a terminal of the multiblock copolymer. Also provided are a method of preparing the multiblock copolymer, a polymer electrolyte membrane prepared from the multiblock copolymer, a method of preparing the polymer electrolyte membrane, and a fuel cell including the polymer electrolyte membrane. The polymer electrolyte membrane that has a high ionic conductivity and good mechanical properties and minimizes crossover of methanol can be manufactured at low cost. In addition, the structure of the multiblock copolymer can be varied to increase selectivity to a solvent used in a polymer electrolyte membrane.

■ **Liquid fuel cell, membrane electrode assembly and cathode**

- 등록번호 : 7759019
- 발명자 : Mei, Wu(Yokohama, JP), Maruyama, Miho(Yokohama, JP), Tamura, Jun(Yokohama, JP), Akasaka, Yoshihiro(Kawasaki, JP), Nakano, Yoshihiko(Yokohama, JP)
- 출원인 : Kabushiki Kaisha Toshiba(Tokyo, JP)
- 초록 : A cathode includes a diffusion layer, and a porous catalyst layer provided on the diffusion layer. The porous catalyst layer has a thickness not greater than 60 μm , a porosity of 30 to 70% and a pore diameter distribution including a peak in a range of 20 to 200 nm of a pore diameter. A volume of pores having a diameter of 20 to 200 nm is not less than 50% of a pore volume of the porous catalyst layer. The porous catalyst layer contains a supported catalyst comprising 10 to 30% by weight of a fibrous supported catalyst and 70 to 90% by weight of a granular supported catalyst. The fibrous supported catalyst includes a carbon nanofiber having a herringbone structure or a platelet struc-

ture. The granular supported catalyst includes a carbon black having 200 to 600 mL/100 g of a dibutyl phthalate (DBP) absorption value.

■ **Water treatment by dendrimer-enhanced filtration**

- 등록번호 : 7758755
- 발명자 : Diallo, Mamadou S.(Pasadena, CA, US)
- 출원인 : California Institute of Technology(Pasadena, CA, US)
- 초록 : Described herein are compositions and methods useful for the purification of water using dendritic macromolecules. The process involves using dendritic macromolecules (dendrimers) to bind to contaminants, and a filtration step to produce water from which contaminants have been removed or modified. Examples of dendrimers that may be used in the process include cation-binding dendrimers, anion-binding dendrimers, organic compound-binding dendrimers, redox-active dendrimers, biological compound-binding dendrimers, catalytic dendrimers, biocidal dendrimers, viral-binding dendrimers, multi-functional dendrimers, and combinations thereof. The process is readily scalable and provides many options for customization.

■ **Preparation of membranes using solvent-less vapor deposition followed by in-situ polymerization**

- 등록번호 : 7754281
- 발명자 : O'Brien, Kevin C.(San Ramon, CA, US), Letts, Stephan A.(San Ramon, CA, US), Spadaccini, Christopher M.(Oakland, CA, US), Morse, Jeffrey C.(Pleasant Hill, CA, US), Buckley, Steven R.(Modesto, CA, US), Fischer, Larry E.(Los Gatos, CA, US), Wilson, Keith B.(San Ramon, CA, US)
- 출원인 : Lawrence Livermore National Security, LLC(Livermore, CA, US)
- 초록 : A system of fabricating a composite

membrane from a membrane substrate using solvent-less vapor deposition followed by in-situ polymerization. A first monomer and a second monomer are directed into a mixing chamber in a deposition chamber. The first monomer and the second monomer are mixed in the mixing chamber providing a mixed first monomer and second monomer. The mixed first monomer and second monomer are solvent-less vapor deposited onto the membrane substrate in the deposition chamber. The membrane substrate and the mixed first monomer and second monomer are heated to produce in-situ polymerization and provide the composite membrane.

■ **Method of wastewater treatment with excess sludge withdrawal reduced**

- 등록번호 : 7754081
- 발명자 : Baba, Yasuhiro(Saijo, JP), Fujii, Hiroaki(Saijo, JP), Okabe, Hidehiko(Saijo, JP), Kobayashi, Goro(Osa-ka, JP)
- 출원인 : Kuraray Co., Ltd.(Kurashiki-shi, JP)
- 초록 : A method of wastewater treatment that reduced equipment cost and running cost and realizes high efficiency implementation and further tank miniaturization, and that reduces excess sludge withdrawal. There is provided a method of wastewater treatment with excess sludge withdrawal reduced, characterized in that there are installed an aeration tank wherein wastewater is brought into contact with carrier particles under aerobic conditions, a total oxidization tank and a sedimentation tank, and that operation is made while maintaining the BOD sludge load in the total oxidization tank at 0.08 kg-BOD/Kg-MLSS*day or smaller, and that a coagulant is charged in the complete oxidization tank in order to improve the setting in the sedimentation tank.

■ **Polymer/carbon nanotube composites, methods of use and methods of synthesis thereof**

- 등록번호 : 7754055
- 발명자 : Harmon, Julie P.(Tampa, FL, US), Clayton, LaNetra M.(Plant City, FL, US)
- 출원인 : University of South Florida(Tampa, FL, US)
- 초록 : Polymer/carbon nanotube composites including single-wall or multi-wall carbon nanotubes incorporated into the matrix of a polymer are provided. These composites can be used in environments exposed to galactic cosmic radiation. Accordingly, the composites are useful in deep space applications like space vehicles, space stations, personal equipment as well as applications in the biomedical arts and atom splitting research. The composites can be modified with organic dyes containing at least one phenyl ring and the resulting doped composite is useful as a radiation detector. The preferred polymer is poly(4-methyl-1-pentene). At low nanotube concentrations (i.e., about 0.5 wt % or less), the composites exhibit transparent optical qualities. At higher nanotube concentrations (i.e., about 0.6 wt % or more), the composites are non-transparent.

■ **Integrally-layered polymeric membranes and method of use**

- 등록번호 : 7749387
- 발명자 : Sabottke, Craig Y.(Annandale, NJ, US), Kaul, Bal K.(Fairfax, VA, US), Peiffer, Dennis G.(Annandale, NJ, US)
- 출원인 : Exxonmobil Research and Engineering Company(Annandale, NJ, US)
- 초록 : This invention relates to the composition of an integrally-layered polymeric membrane and a process for utilizing the integrally-layered polymeric membrane components of a feedstream. More particularly, but not by way of limitation, this invention relates to the composition of an integrally-layered polymeric membrane and a process for utilizing the integrally-layered polymeric

membrane in the separation of aromatics from a hydrocarbon based feedstream. The polymeric membranes of the present invention are fabricated by chemically crosslinking adjacent polymer membrane layers of the same or differing copolymer solutions to produce an integrally-layered polymeric membrane with improved separations properties.

■ **Hollow fiber membrane module, and a manufacturing method therefor, and housing for hollow fiber membrane module**

- 등록번호 : 7749381
- 발명자 : Nakahara, Yoshihito(Nagoya, JP), Torichigai, Tetsuya(Seto, JP), Kamata, Masatoshi(Owariasahi, JP), Ito, Masanori(Aichi-gun, JP), Honjou, Kenji(Nagoya, JP), Okazaki, Hiroyuki(Nagoya, JP), Kakumoto, Yoshihiro(Seto, JP)
- 출원인 : Mitsubishi Rayon, Co., Ltd.(Tokyo, JP)
- 초록 : In a hollow fiber membrane flat module according to the present invention, both ends of hollow fiber membrane bundle which are formed by bundling a plurality of hollow fiber membrane as a sheet are fixed to two housing separately by a fixing resin while maintaining an opening condition in an opening end section in the hollow fiber membrane. Furthermore, a maximum width in an orthogonal direction to a longitudinal direction of the hollow fiber membrane is no longer than 25 mm in a cross section which is orthogonal to a longitudinal direction of the housings, and a maximum deflection in the housings which are measured according to a method for measuring the deflection according to the present invention is not more than 1% of a distance between the two housings. In such a hollow fiber membrane module, it is possible to enhance the integration ratio of the hollow fiber membrane module per a unit volume of the hollow fiber membrane module unit in which there is less deflections in the housing caused by adjust the wavelength dispersion and the dispersion slope always in

minimum level automatically only by matching the position of the reflecting mirror, the dispersion compensation amount and the dispersion slope compensation amount which correspond to a shape of the reflecting surface on the reflecting mirror which is selected under such a current condition in advance. Factors such as an air bubble, and the entanglement of the hollow fiber membranes is restricted; thus, a hollow fiber membrane is not damaged. Also, in the hollow fiber membrane module, it is preferable that the housing is provided with a reinforcing rib section which strengthens the housing.

■ **Polymer composite, film thereof and separation membrane made therefrom**

- 등록번호 : 7745538
- 발명자 : Seo, Yongsok(190 44-1302 Hyundai Apartment Okumdong, Songpaku, Seoul, KR)
- 출원인 : -
- 초록 : Polymer composite including a compatibilizer and having selective permeability to chemical permeants due to interaction differences between the compatibilizer and the chemical permeants, includes 50-99 wt% of an amorphous thermoplastic resin selected from the group polyethylenepropylendienterpolymer, poly(1-(trimethylsilyl)-1-propyne), amorphous nylon, polystyrene and polycarbonate; 0.9-50 wt% of a semi-crystalline polymer selected from the group polyamide (nylons), polyethylene terephthalate, polybutylene terephthalate, polyethylene, polypropylene, polyetheretherketone, polyvinylidene fluoride, polytetrafluoroethylene, polyphenylene sulfide, and thermotropic or lyotropic liquid crystal polymer, and dispersed in the amorphous thermoplastic resin to provide a dispersed phase having an interface with the amorphous thermoplastic resin; and 0.1-10 wt% of a compatibilizer positioned at the interface of the dispersed phase with the amorphous thermoplastic resin and having different interac-

tions with different chemical permeants so that the selective permeability of the polymer composite is affected.

■ Membrane electrode assembly for solid polymer electrolyte fuel cell

- 등록번호 : 7745037
- 발명자 : Matsuo, Junji(Saitama, JP), Fukuda, Kaoru(Saitama, JP)
- 출원인 : Honda Motor Co., Ltd.(Tokyo, JP)
- 초록 : A membrane electrode assembly for a solid polymer electrolyte fuel cell includes an anode electrode, a cathode electrode, and a polymer electrolyte membrane sandwiched by the electrodes, the catalyst layer of the cathode electrode containing a catalyst supporting particle in which a precious metal is supported on heat-treated carbon black or activated carbon, an ion conductive material, and a crystalline carbon fiber. Heat treatment is preferably applied at 2,500 to 3,000°C. (degrees Celsius). The membrane electrode assembly provides superior power generation performance.

■ Process of forming multilayered structures

- 등록번호 : 7743929
- 발명자 : Kools, Willem(Winchester, MA, US)
- 출원인 : Millipore Corporation(Bedford, MA, US)
- 초록 : The present invention provides for a method of producing an integral multilayered porous membrane by simultaneously co-casting a plurality of polymer solutions onto a support to form a multilayered liquid sheet and immersing the sheet into a liquid coagulation bath to effect phase separation and form a porous membrane. The support can be a temporary support or form an integrated support for the membrane. The plurality of layers may be of the same polymer or different, same concentration or viscosity or different and may be subjected to the same processing conditions

or different ones to form unique structures.

■ Barrier membrane

- 등록번호 : 7741427
- 발명자 : Molenberg, Aaldert Rens(Binningen, CH)
- 출원인 : Straumann Holding AG(Basel, CH)
- 초록 : The present invention relates to a cell-occlusive membrane, obtainable by reaction of at least two precursors in the presence of water. The first precursor A comprises a core and n chains each having a conjugated unsaturated group or a conjugated unsaturated bond, and the second precursor B comprises a core and m chains each having a thiol group, wherein m is greater than or equal to 2, n is greater than or equal to 2, and m+n is greater than or equal to 5. The reaction forms a three dimensional network with crosslinking-points. The adjacent crosslinking-points are connected by a chain having less than 600 atoms.

■ Ion-conductive binder membrane-electrode assembly and fuel cell

- 등록번호 : 7740968
- 발명자 : Yamashita, Takashi(Tsukuba, JP), Na-kai, Shinji(Tsukuba, JP), Ogi, Hiroyuki(Tsukuba, JP), Ono, Tomohiro(Tsukuba, JP), Rikukawa, Masahiro(Chiyoda-ku, JP)
- 출원인 : Kuraray Co., Ltd.(Kurashiki-shi, JP)
- 초록 : This invention relates to an ion-conducting binder used for a membrane electrode assembly for polymer electrolyte fuel cells, the assembly consisting of a polymer electrolyte membrane and two gas diffusion electrodes stuck to the polymer electrolyte membrane with the membrane put between the electrodes, which binder comprises a block copolymer which comprises a polymer block (A) having as a main unit an aromat-

ic vinyl compound unit whose α -carbon is quaternary carbon, and a flexible polymer block (B), and has ion-conducting groups on the polymer block (A), and a solution or suspension thereof, and a membrane electrode assembly and a polymer electrolyte fuel cell. The ion-conducting binder, membrane electrode assembly and polymer electrolyte fuel cell of this invention are economical, mild to the environment and excellent in moldability and oxidation stability.

■ Fuel cell membrane containing zirconium phosphate

• 등록번호 : 7736780

• 발명자 : Yang, Zhen-Yu(Hockessin, DE, US)

• 출원인 : E. I. du Pont de Nemours and Company(Wilmington, DE, US)

• 초록 : The present invention provides for a compound having the following structure: $Zr(O_3PZ_qY_nX)_{2-m}(O_3PR)_m$, wherein X=a functional group such as CO_2H , $PO(OH)_2$, and SO_3H , and SO_2NHSO_2W , wherein W=aryl of 6 to 10 carbon atoms or Y; Y=perfluoro-linear, branched or cyclic alkylene group, wherein the alkylene is 1-20 carbon atoms, or a fluorinated group containing at least one substituent selected from the group consisting of oxygen, chlorine and bromine; Z=alkylene of 1-12 carbon atoms, aryl of 6-10 carbon atoms, or a heterocyclic aryl group of 3-10 carbons atoms; R=alkyl of 1-12 carbon atoms, aryl of 6-10 carbon atoms, substituted alkyl, or substituted aryl, wherein the substituent is selected from the group consisting of F, Cl, perfluoroalkyl, alkyl of 1-12 carbon atoms and aryl of 6-10 carbon atoms; n=0 or 1; q=0 or 1; and m=0 to 1.5; with the proviso that when n=0, and q=1, Z=at least one heterocyclic group having 3 to 10 carbon atoms, 1 to 5 nitrogen atoms and 0 to 4 oxygen atoms. The invention also provides a polymer electrolyte membrane, a catalyst coated membrane and a fuel cell having this compound.

■ Proton-conducting polymer membrane containing polyazole blends, and application thereof in fuel cells

• 등록번호 : 7736779

• 발명자 : Uensal, Oemer(Mainz, DE), Kiefer, Joachim(Losheim Am See, DE), Calundann, Gordon(North Plainfield, NJ, US), Sansone, Michael J.(Berkeley Heights, NJ, US), Benicewicz, Brian(Loudonville, NY, US), Choe, Eui W.(Randolph, NJ, US)

• 출원인 : BASF Fuel Cell(DE)

• 초록 : The present invention relates to a proton-conducting polymer membrane which comprises polyazole blends and is obtainable by a process comprising the steps

A) preparation of a mixture comprising polyphosphoric acid, at least one polyazole (polymer A) and/or one or more compounds which are suitable for forming polyazoles under the action of heat according to step B),

B) heating of the mixture obtainable according to step A) under inert gas to temperatures of up to $400^\circ C$.,

C) application of a layer using the mixture from step A) and/or B) to a support,

D) treatment of the membrane formed in step C) until it is self-supporting, wherein at least one further polymer (polymer B) which is not a polyazole is added to the composition obtainable according to step A) and/or step B) and the weight ratio of polyazole to polymer B is in the range from 0.1 to 50.

■ Membrane separation of feed and growth environments in carbon nanostructure growth

• 등록번호 : 7736616

• 발명자 : Lusk, Mark Thomas(Highlands Ranch, CO, US), Hornyak, G. Louis(Ft. Collins, CO, US), Burke, Michael Thomas(Arizona, CO, US)

• 출원인 : Colorado School of Mines(Golden, CO, US)

- **초록** : The invention provides CVD-based methods for growing single-walled or multi-walled carbon nanotubes. In the methods of the invention, the nanotube growth environment is separated from the carbon-containing gas feed environment using a membrane which is substantially impermeable to gas flow but permits diffusion of carbon through the membrane. A catalyst for carbon nanotube growth is located on the growth side of the membrane while a catalyst for decomposition of carbon-containing gas is located on the feed side of the membrane. A path for diffusion of carbon through the membrane is provided between the growth and decomposition catalysts. Control of the size and shape of the carbon nanotube growth catalyst enables control over the nanotube structure formed.

■ Encapsulated water treatment system

- **등록번호** : 7736503
- **발명자** : Kennedy, Gregory(Maplewood, MN, US), Khamis, Chaouki(Edina, MN, US)
- **출원인** : Eco Water Systems, LLC(Woodbury, MN, US)
- **초록** : A water treatment system is provided having an encapsulate manifold with a reverse osmosis cartridge and one or more filter cartridges. The filter cartridge includes a detent for being received within a slot in the manifold head for secure locking engagement. The water treatment system further includes a single probe conductivity monitoring system for monitoring the performance of a reverse osmosis membrane. The water treatment system is also provided in a modular arrangement wherein manifold heads are physically and fluidly coupled together via a clip which interfaces with the modular manifold heads. The water treatment system also allows for a retrofit application to include a permeate pump. The cartridges are also designed to provide a mini-

um annular inlet gap to minimize spillage during changing of the cartridges.

■ Gas diffusion layer incorporating a gasket

- **등록번호** : 7732083
- **발명자** : Steinbach, Andrew J. L.(Minneapolis, MN, US), Debe, Mark K.(Stillwater, MN, US), Le, Jimmy M.(Saint Paul, MN, US), Obradovich, Stephan J.(Menomonie, WI, US), Iverson, Eric J.(Eau Claire, WI, US)
- **출원인** : 3M Innovative Properties Company(St. Paul, MN, US)
- **초록** : A gas diffusion layer incorporating a gasket (GIG) is described along with assemblies incorporating the GIG subassembly. Processes for making the GIG and membrane electrode assemblies (MEAs) incorporating the GIG are also described. A GIG subassembly includes a gas diffusion layer (GDL) and a gasket bonded to the GDL. The gasket includes a first gasket layer and a second gasket layer. The second gasket layer is formed of a gasket material in contact with the first gasket layer and the GDL. The gasket material of the second gasket layer bonds the GDL to the first gasket layer. An adhesive layer, and optionally a removable adhesive liner, is disposed on a surface of the first gasket layer opposite the second gasket layer. In some MEA configurations, the GDL is disposed within an aperture in the first gasket layer.

■ Film for membrane structure

- **등록번호** : 7732045
- **발명자** : Nakao, Takuya(Chiyoda-ku, JP), Yamauchi, Masaru(Chiyoda-ku, JP), Fusyuku, Tutomu(Chiyoda-ku, JP)
- **출원인** : Asahi Glass Company, Limited(Tokyo, JP)
- **초록** : A film for a membrane structure, which comprises a film substrate containing a fluo-

roresin, a photocatalyst layer and an interlayer interposed between the film substrate and the photocatalyst layer, wherein the fluororesin is at least one member selected from the group consisting of an ethylene/tetrafluoroethylene copolymer, a tetrafluoroethylene/hexafluoropropylene copolymer, a tetrafluoroethylene/perfluoro(alkyl vinyl ether) copolymer, a polyvinyl fluoride and a polyvinylidene fluoride; the interlayer contains an organic-inorganic hybrid polymer obtained by hydrolyzing/co-condensing at least one member selected from the group consisting of an organosilane, a hydrolysate of an organosilane and a condensate of an organosilane, and a silyl group-containing organic polymer; and the mass remaining ratio of the organic-inorganic hybrid polymer is from 50 to 80% at 500°C, measured by thermogravimetric analysis.

■ Process for producing nanoparticle or nanostructure with use of nanoporous material

- 등록번호 : 7732015
- 발명자 : Nomura, Shintaro(Tsukuba, JP), Itoh, Hironori(Tsukuba, JP)
- 출원인 : Japan Science and Technology Agency(Kawaguchi-shi, Saitama, JP)
- 초록 : A nanostructure including a nanoporous material having micropores filled with a fragmented thin-film material from the opening-side of each micropore, the nanoporous material being obtained by placing a thin-film material on a surface of a nanoporous material and pressing the thin-film material so that the thin-film material is cut out at the surface edge of each micropore of the nanoporous material and pressed into the micropore. By removing the nanoporous material from the nanoporous material, microparticles constituted from the thin-film material that filled the nanoporous material are obtained. By covering all the wall surfaces of the micropores of the nanoporous material in advance, nanocapsules each constituted from a tubular structure composed of the thin film covering the entire wall surface of the

micropore and a cover made of a thin-film material filled in the vicinity of the opening of the micropore can be formed.

■ Multi-polymer hydrogels

- 등록번호 : 7731988
- 발명자 : Thomas, Brian(Columbia City, IN, US), Zhang, Kai(Warsaw, IN, US)
- 출원인 : Zimmer, Inc.(Warsaw, IN, US)
- 초록 : The invention provides a multi-polymer hydrogel article having a first polymeric, water-swallowable material and a second polymeric material, organized such that a first region substantially comprises the first polymeric, water-swallowable material, a second region adjacent the first region comprises a mixture of the first polymeric, water-swallowable material and the second polymeric material, and a third region adjacent the second region substantially comprises the second polymeric material. The article exhibits an increasing concentration gradient of the second polymeric material moving from the first region, through the second region, to the third region. The invention also provides methods for forming a multi-polymer hydrogel article by (a) forming a hydrogel structure using a first polymeric, water-swallowable material, (b) creating an aerogel structure having a plurality of open pores by dehydrating the hydrogel structure, (c) contacting the aerogel structure with a second polymeric material to incorporate the second polymeric material into at least a portion of the plurality of open pores to form the multi-polymer hydrogel article, and (d) rehydrating the multi-polymer hydrogel article.

■ Polymer electrolyte, method of preparing the same, and fuel cell using the polymer electrolyte

- 등록번호 : 7727675
- 발명자 : Cho, Myung-dong(Yongin-si, KR), Kim, Tae-young(Yongin-si, KR)

•출원인 : Samsung SDI Co., Ltd.(Suwon-si, KR)

•초록 : A polymer electrolyte includes a heat-treated polymerization product of a polyurethane-based compound and a polyethylene(meth)acrylic acid, wherein the polyurethane-based compound is produced by polymerizing a diisocyanate-based compound, a phosphoric acid-based polyol, and a chain extender. The polymer electrolyte has a high ionic conductivity at high temperatures without causing deformation of an electrolyte membrane. The polymer electrolyte membrane can be inexpensively and simply manufactured, and the thickness of the membrane can be easily controlled. In addition, a large amount of phosphoric acid can be impregnated into the polymer electrolyte. A fuel cell that is operative at a temperature of 100°C. or higher under non-humidified conditions and has improved energy generating efficiency can be prepared by employing the polymer electrolyte membrane.

■ Membrane-electrode assembly for solid polymer electrolyte fuel cell and method of producing the same

•등록번호 : 7727654

•발명자 : Kanaoka, Nagayuki(Saitama, JP), Iguchi, Masaru(Saitama, JP), Sohma, Hiroshi(Saitama, JP)

•출원인 : Honda Motor Co., Ltd.(Tokyo, JP)

•초록 : Membrane-electrode assemblies are provided having a solid polymer electrolyte membrane that exhibits higher proton conductivity over a wide temperature range, and exhibits superior hot water resistance, chemical stability, toughness and mechanical strength. The membrane-electrode assemblies utilized for solid polymer electrolyte fuel cells include an anode electrode, a cathode electrode and a solid polymer electrolyte membrane, the anode electrode and the cathode electrode disposed on

opposite sides of the solid polymer electrolyte membrane. The solid polymer electrolyte membrane contains a polyarylene copolymer with a specific constitutional unit having a fluorine atom and nitrile group introduced in their principal chains.

■ Polymer electrolyte membrane and fuel cell using the same

•등록번호 : 7727653

•발명자 : Cho, Chung-kun(Suwon-si, KR), Lee, Doo-yeon(Yongin-si, KR), Sun, Hee-young(Yongin-si, KR)

•출원인 : Samsung SDI Co., Ltd.(Suwon-si, KR)

•초록 : A polymer electrolyte membrane includes a poly(benzoxazole) polymer doped with at least one acid. The polymer electrolyte membrane is manufactured by impregnating poly(benzoxazole) with an acid and has better ionic conductivity at high temperatures and better mechanical properties than a conventional poly(benzoxazole) polymer electrolyte membrane. In addition, the polymer electrolyte membrane has equivalent thermal stability to a conventional polymer electrolyte membrane.

■ Polymer electrolyte fuel cell system

•등록번호 : 7727649

•발명자 : Nishimura, Katsunori(Hitachiota, JP), Okuda, Yuki(Hitachi, JP), Imahashi, Jinichi(Hitachi, JP)

•출원인 : Hitachi, Ltd.(Tokyo, JP)

•초록 : A polymer electrolyte fuel cell comprises a fuel cell stack and a humidifier. The fuel cell stack includes plural cells in which each cell has a pair of electrodes and a proton-conductive electrolyte membrane arranged between the pair of electrodes, wherein an oxidant gas or a fuel gas passes through the humidifier before being fed to the fuel cell stack, and wherein a wet gas containing water or water vapor also passes through the

humidifier. In the fuel cell, the humidifier includes a porous separating layer and a hydrophilic water-releasing layer, wherein the separating layer is configured to separate the wet gas from the oxidant gas or the fuel gas in the humidifier, and wherein the hydrophilic water-releasing layer is disposed in a side of the oxidant gas or the fuel gas to the separating layer in the humidifier.

■ Membranes and methods of treating membranes

- 등록번호 : 7727434
- 발명자 : Kniajanski, Sergei(Clifton Park, NY, US), Yeager, Gary William(Rexford, NY, US), Kurth, Christopher James(Chaska, MN, US), Iverson, Isaac Keene(Minnetonka, MN, US), Kloos, Steven Duwayne(Chanhassen, MN, US), Hodgins, Leonard Timbrook(Closter, NJ, US)
- 출원인 : General Electric Company(Niskayuna, NY, US)
- 초록 : Membranes as well as a methods of treating membranes are disclosed. The method of treating a membrane includes contacting the membrane with a first solvent, contacting the membrane with an inert solvent, and contacting the membrane with an amine reactive compound. The first solvent includes a solvent having a Hansen solubility parameter in a range from about 10.0 to about 18. The membrane includes a polymer having an amine group.

■ Method for treating produced water

- 등록번호 : 7722770
- 발명자 : Shafer, Lee L.(Big Piney, WY, US),

James, John W.(Boulder, WY, US), Rath, Richard D.(Larkspur, CO, US), Eubank, Jesse(LaBarge, WY, US)

- 출원인 : Anticline Disposal, LLC(Rapid City, SD, US)
- 초록 : Systems and methods have been developed for treating the waste water contaminated with methanol and boron in addition to other contaminants. The systems and methods allow specifically for the removal of the methanol and boron without the addition of significant chemicals to raise the pH. The water is treated by removing the methanol via biological digestion in a bioreactor, separating a majority of the contaminants from the water by reverse osmosis and removing the boron that passes through the reverse osmosis system with a boron-removing ion exchange resin.

■ Pressure relief valve for a packaging container

- 등록번호 : 7721752
- 발명자 : Stotkiewitz, Herbert(Bietigheim-Bissingen, DE), Stadel, Hans-Peter(Lorch, DE)
- 출원인 : Robert Bosch GmbH(Stuttgart, DE)
- 초록 : The invention relates to a pressure relief valve, comprising a base body, which is covered by a valve membrane. The base body which is located on the inner face of a packaging container, permits the escape of excess pressure from the packaging container into the atmosphere by means of passages and perforations that are configured in the wall of the packaging material. The inventive pressure relief valve thus responds particularly well, i.e. allowing particularly low opening pressures, by means of the special configuration of its base area.