

최신 미국특허 등록 목록

■ Apparatus for purifying blood

- **Patent number** : WO 2008/023388
- **Inventors** : B. Chattopadhyay
- **Applicant** : B. Chattopadhyay, India
- **Abstract** : This patent provides details of a device for purifying blood. It is composed of membranes placed inside chambers that are next to each other. Also included is an impermeable jacket that has a porous permeable membrane connected to the first set of membranes through a channel. A unidirectional valve, connected to the porous membrane, allows unpurified blood to enter into chambers using the channel. A chamber, connected to the first set of membranes through the channel - to store an L1 solution - is provided with a bubble trapper valve to prevent air bubbles from entering the chamber. The outlet of the chambers is connected to a waste outlet through two channels, to carry an impure L2 solution. The outlets of the membranes are connected to the purified blood outlet through two channels to circulate purified blood.

■ Composite, oxygen ion-transport membrane

- **Patent number** : WO 2008/024405
- **Inventors** : N. Nagabhushana, J.A. Lane, G.M. Christie, and B.A. van Hassel
- **Applicant** : Praxair Technology Inc, USA
- **Abstract** : The subject of this patent is a composite, oxygen ion-transport membrane (1). It has a dense layer (10); a porous support layer (12); an optional intermediate porous layer (14), located between the porous support layer and the dense layer; and an optional surface exchange layer (16), overlying the dense layer. The dense layer has electronic and ionic phases. The ionic phase is composed of scandia-doped yttrium or cerium stabilised zirconia. The electronic phase is composed of a metallic oxide, containing lanthanum,

strontium, chromium, manganese and vanadium, and optionally cerium. The porous support layer is composed of zirconia partially stabilised with yttrium, scandium, aluminium or cerium or a mixture of these. The intermediate porous layer, if used, contains the same ionic and electronic phases as the dense layer. The surface exchange layer is formed from an electronic phase of a metallic oxide of lanthanum and strontium that also contains either manganese or iron and an ionic phase of scandia-doped zirconia, stabilised with yttrium or cerium.

■ Device for removing fluid from blood

- **Patent number** : WO 2008/024434
- **Inventors** : B.A. Solomon, G.S. Erman and F.A. Fazio
- **Applicant** : Fresenius Medical Care Holdings Inc, USA
- **Abstract** : An ultrafiltration (UF) device and method have been developed for the removal of excess fluid in hypervolemic patients and/or the removal of toxins in a patient's blood, including those suffering from either renal or cardiovascular disease. An embodiment of the device includes a housing (1) containing multiple, large-bore hollow-fibre membranes (5). These are 'connected' to the patient's vascular system via an element (2, 3) comprising bifurcated fluid pathway units to channel the blood flow either to or from each hollow-fibre membrane of the device, a channel to direct the fluid removed by the device to a suitable collection container or the patient's bladder, and a way of controlling excessive removal of water from the patient. The device can be either worn 'extracorporeally' or surgically implanted in order to enable fluid to be removed continuously, and while the patient is free to move about easily.

- **Sequencing batch reactor with continuous membrane filtration and solids reduction**
 - **Patent number** : WO 2008/024445
 - **Inventors** : R.A. Elefritz (Jr) and J.H. Scott (III)
 - **Applicant** : Siemens Water Technologies Corporation, USA
 - **Abstract** : A method and system of treating wastewater (102) that can provide operational flexibility is described by this patent. To treat the wastewater the system includes a sequencing batch reactor (112), which typically cycles through any of the fill, react, settle, decant and idle stages. The system also uses a membrane filtration system (120) to further treat water from the sequencing batch reactor and produce suitable water. A solids-reducing system (130) is connected to the sequencing batch reactor. This reduces an amount of biodegraded solids by changing the character or distribution of the micro-organisms population in the biomass.

- **Using chlorine dioxide to prevent bio-fouling of membranes**
 - **Patent number** : WO 2008/024828
 - **Inventors** : T.E McWhorter, A.A. Rosenblatt, J. Anderton, D. Gregory and J. Elwell
 - **Applicant** : CDG Technology Inc, USA
 - **Abstract** : A method is disclosed for treating a water filtration membrane. It is used to prevent bio-fouling of membranes. It involves forming a chlorine dioxide stream (containing a sufficient amount of chlorine dioxide) to prevent the formation of (or eliminate) a bio-film on the membrane. The membrane is substantially stable in the chlorine dioxide stream. The chlorine dioxide can be introduced into a water feed-stream that leads to the membrane. The method is particularly useful when applied to filtration membranes in a water purification plant.

- **Composite RO membrane**
 - **Patent number** : WO/2008/025259
 - **Inventors** : X. Zhao, Y. He, Z. Wu, Z. Cai, S. Wang, C. Long and F. Liu

- **Applicant** : Vontron Membrane Technology Co Ltd, China
- **Abstract** : A composite reverse osmosis (RO) membrane that is resistant to oxidation has been developed. It is composed of a porous support and a polyamide layer. In the preparation of this membrane, the polyamide layer is modified by an agent so that the membrane retains a salt rejection of at least 85% after being subjected for about one hour to an aqueous solution of NaClO that has a concentration of about 2000 to 30000 ppm.

- **Liquid filtration systems**
 - **Patent number** : WO 2008/026079
 - **Inventors** : R. Luning, U. Klaus and L.J. Purcell
 - **Applicant** : Saxonia Bio Tec GmbH, Germany
 - **Abstract** : The filtration module detailed by this patent is composed of a housing that has an inlet and an outlet. A plurality of hollow-fibre membranes are disposed in the housing—each membrane having a wall and a lumen open to the outlet. A porous shell is disposed in the housing and encases the plurality of hollow-fibre membranes. This shell has an opening through which the ends of the hollow-fibre membranes pass. There is a plug in the outlet and the ends of the hollow-fibre membranes pass through the plug and the shell, ending in the plug. A liquid treatment apparatus, which uses the filtration module is also disclosed, as are a method of making the filtration module and the liquid treatment apparatus.

- **System for characterising membranes and membrane-based filtration devices**
 - **Patent number** : WO 2008/027861
 - **Inventors** : J. Ji
 - **Applicant** : GE Healthcare Bio-Sciences Corporation, USA
 - **Abstract** : A system for characterising a membrane is disclosed. The system includes a container that is configured to dissolve a first, large molecular weight marker and a second large molecular

weight marker into a solution. The container is connected to a reservoir. The reservoir is configured to receive the solution. A filtration unit is connected to the reservoir, where the filtration unit is configured to separate the first large molecular weight marker and the second large molecular weight marker from the solution. A measuring system is configured to determine if the first large molecular weight marker is equal to or larger than a first target concentration, where if the first large molecular weight marker is equal to or larger than the first target concentration then it meets a first criteria for rejection by the membrane. The measuring system is also configured to determine if the second large molecular weight marker is equal to or smaller than a second target concentration, where if the second large molecular weight marker is equal to or smaller than the second target concentration then it meets a second criteria for passage through the membrane.

■ **Preparation of nano-composite membranes**

- **Patent number** : WO 2008/028155
- **Inventors** : E. Marand and S. Kim
- **Applicant** : Virginia Tech Intellectual Properties Inc, USA
- **Abstract** : Nano-composite membranes and methods for making them are described by this patent. The nano-composite membranes are made from a layer of oriented, carbon nano-tubes fixed in a polymeric matrix. Methods for efficient, facile and inexpensive fabrication of the nano-composite membranes using a filtration method are also described. The carbon nano-tubes also may be modified with chemical functional groups to promote their orientation in the carbon nano-tube layer or to give them other properties.

■ **Nano-pore ion-selective electrodes**

- **Patent number** : WO 2008/030582
- **Inventors** : H. White, R.J. White, R.B. Brown, H. Nam and J.H. Shim
- **Applicant** : University of Utah Research Foundation, USA
- **Abstract** : An ion-selective electrode, based on a nano-pore structure, and methods of

manufacturing and using it are disclosed and described by this patent. The ion-selective electrode can include a pore that is present in a solid material and that has a nano-size opening (in the solid material); a metal conductor disposed inside the pore, opposite the opening in the solid material; a reference electrode material that contacts the metal conductor and disposed inside the pore; a conductive composition that is in contact with the reference electrode and disposed within the pore; and an ion-selective membrane. The ion-selective membrane can be configured to isolate the metal conductor, reference electrode material and conductive composition within the pore.

■ **Heavy metal removal from industrial wastewater**

- **Patent number** : WO 2008/030652
- **Inventors** : D.A Musale and B. Johnson
- **Applicant** : Nalco Company, USA
- **Abstract** : This patent covers a method of removing one or more heavy metals from industrial wastewater using a membrane separation process. Specifically, it involves the following steps: collecting industrial wastewater containing heavy metals in a receptacle; adjusting the pH so that the system is able to achieve hydroxide precipitation of the heavy metal; and adding an effective amount of a water-soluble ethylene dichloride-ammonia polymer (with a molecular weight of 500-10000 daltons) that contains from 5-50 mole percent of dithiocarbamate salt groups to react with the heavy metals. The treated industrial wastewater is then passed through a submerged ultrafiltration (UF) or microfiltration (MF) membrane. As an option, the membrane can be back-flushed to remove solids from its surface. Referring to the accompanying figure, industrial wastewater, containing heavy metals is collected in the receptacle (1), in which an acid or base is added through a line (3) to adjust the pH to 3-4. A chelant scavenger, such as iron compound is then added through a second line (3A). The water then flows into a receptacle (2), in which the pH is adjusted to 8-10 through an in-line link (4) or directly with

the addition (5) of base in the receptacle (2). From the receptacle (2) the water then flows to a third receptacle (8) in which a UF or MF membrane (10) is submerged. Aeration may be applied to the membrane. The polymeric chelant may be added though an in-line link (6) or directly (9) into the membrane tank (8). After the ethylene dichloride-ammonia polymers are added, one or more water-soluble polymers may be added optionally before the water flows into membrane tank (8). The permeate (11) from the submerged UF or MF membrane process may be optionally treated by passing it through an additional membrane (12) and the reject (concentrate) (13) may be sent for further dewatering or disposal.

■ **Biological fluid analysis system**

• **Patent number** : WO 2008/032076

• **Inventors** : R. Katakya

• **Applicant** : RTC North Ltd, UK

• **Abstract** : The subject of this patent is a system for analysing biological fluids. It includes an integrated sensing and separation component (108) for monitoring and analysing clinical species present in biological fluids. In the preferred embodiment it makes use of a polyHIPE membrane (109) with a chemically active sol-gel (110), and a plurality of micro-electrode arrays adapted for selectively adjusting sensitivity.

■ **Electro-deionisation apparatus containing an ion-exchange material**

• **Patent number** : WO 2008/036461

• **Inventors** : J.H. Barber and D.F. Tessier

• **Applicant** : General Electric Co, USA

• **Abstract** : An electro-deionisation apparatus is detailed by this patent. It includes an ion-concentrating compartment (12), partially bounded by an anion permeable membrane (18) and also partially bounded by a cation permeable membrane (20). Also included is a first ion-exchange material domain (14, 161) disposed within the ion-concentrating compartment. This

first ion-exchange material domain is contiguous with at least a portion of an ion-concentrating, compartment side-surface of the anion permeable membrane or the cation permeable membrane, and is spaced apart from the other one (that is, the anion permeable membrane or the cation permeable membrane). In the case where the anion permeable membrane or the cation permeable membrane (having at least a portion of an ion-concentrating, compartment side-surface with which the first ion-exchange material domain is contiguous), is an anion permeable membrane, then the first ion-exchange material domain is an anion exchange material predominant domain. In the case where the anion permeable membrane or the cation permeable membrane, (having at least a portion of an ion-concentrating, compartment side-surface with which the first ion-exchange material domain is contiguous), is a cation permeable membrane, then the first ion-exchange material domain is a cation exchange material predominant domain.

■ **Patents Desalination of sea water**

• **Patent number** : WO 2008/034448

• **Inventors** : H. Ibrahim

• **Applicant** : H. Ibrahim, Egypt

• **Abstract** : This patent concerns a method and a device for the desalination of sea water by natural osmosis. Sea water enters two compartments (1, 2) separated by a semi-permeable membrane (4). High-molecular substances, such as albumin, are added to one of these compartments thus increasing the osmotic pressure in this compartment. Water diffuses from the compartment containing pure sea water (1) to the compartment additionally containing the high-molecular substance (2). Finally half of the water

containing the high-molecular substance flows through a second membrane (7) to a third compartment (3) thus removing the salt, but retaining the high-molecular substance. Finally the remaining half of the desalinated water is removed via a third membrane (8) retaining the high-molecular substance as well.

■ **Device for gassing a liquid**

- **Patent number** : WO 2008/034570
- **Inventors** : S. Schäfer, K. Vossenkaul, D. Volmering and D. Lawrence
- **Applicant** : Koch Membrane Systems GmbH, Germany
- **Abstract** : This invention relates to a device for gassing a liquid (1), particularly for those membrane facilities that are operating immersion units or systems. It has a gas supply channel (2) and at least one gas lance (3) from which a gas flow exits during the gassing operation. According to the present invention the gas lance is connected to the gas supply channel by means of at least one connection channel (5), composed of a first mouth area (8), on the side of the gas lance, and a second mouth area (8'), on the side of the gas supply channel, and generating as a throttle a flow pressure loss of the gas flow entering the gas lance. Below the first mouth area an extension section (6) is provided, which adjoins the gas lance and has an opening (7) below the first mouth area.

■ **Compositions and devices for electro-filtration of molecules**

- **Patent number** : WO 2008/034573
- **Inventors** : M.D. Faupel and J. van Oostrum
- **Applicant** : Novartis AG, Switzerland
- **Abstract** : This invention relates to means and devices for electro-filtration of mole-

cules. The membranes used by the approach described are composed of N-acryloyl-tris(hydroxymethyl)aminomethane (NAT) covalently linked to a support. The invention further encompasses compositions composed of an isoelectric buffer that is covalently bound to NAT. In particular, the present invention relates to membranes and devices that enable isoelectric filtration of molecules in solution to be carried out.

■ **Gas separation membrane**

- **Patent number** : WO 2008/034581
- **Inventors** : J. Qiu, K.-V. Peinemann, J. Wind and H. Pingel
- **Applicant** : GKSS-Forschungszentrum Geesthacht GmbH, Germany
- **Abstract** : This invention relates to a membrane for gas separation, a method of producing a corresponding membrane, a gas separation module that is based on the corresponding membrane, and also a method of operating such a gas separation module. The membrane includes a porous support layer of polymer or an inorganic material, in particular a ceramic material. It is also composed of a separation layer, made up of a mixture of saccharide derivatives and homopolymer-in particular comprising ethylcellulose, cellulose acetate or poly-4-methyl-1-pentene. The saccharide derivatives have a cyclic structure with five or six ring atoms, or a linear structure, or are monosaccharide derivatives that are bound via glycoside bonds. The number of the monosaccharides bound in this manner is between 2 and 1000. In this case it has been found that the oxygen flow through such a membrane increases considerably when saccharide derivatives are added to the material.