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LEAD ACID

5795486

USE OF BARIUM AND/OR STRONTIUM SULPHIDE TO REMOVE HEAVY METALS IN ACIDIC SOLUTIONS

Chane-Ching Jean-Yves; Fourcot Fabrice Eaubonne, FRANCE assigned to Rhone-Poulenc Chimie

The invention relates to the use of barium sulphide or strontium sulphide for the removal of heavy metals in industrial acidic solutions. The invention is applicable to the purification of contaminated acids, in particular of spent battery acid, or of industrial solutions of titanil sulphate.

5800946

BIPOLAR LEAD-ACID BATTERY PLATES

Grosvenor Victor L; Pinsky Naum Topanga, CA, UNITED STATES

Electrodes, particularly useful in bipolar plates of lead-acid batteries, include a metal-containing substrate, an electrically conductive material secured to the first side of the substrate, an electrically conductive layer including a polymer secured to the second side of the substrate; and a metallic layer secured to the electrically conductive layer so that the electrically conductive layer is located between the metallic layer and the substrate. Bipolar plates are provided and include an electrically conductive electrode element, a grid spaced apart from the electrode in proximity to the first side of the electrode element, positive active material in contact with the first side or second side of the electrode element and negative active material in contact with the first side or second side of the electrode element which is not in contact with the positive active material.

5800948

LEAD-ACID BATTERY AND SEPARATOR THEREFOR

Moseley Patrick T Chapel Hill, NC, UNITED STATES assigned to International Lead Zinc Research Organization Inc

There is disclosed a lead acid battery and battery separator, the separator comprising a porous ceramic body manufactured from ceramic fibers welded together

at their respective contact points such that the resulting separator body is substantially rigid and non-compressible and wherein the separator has a porosity of at least about 90%. The electrodes of the battery may be comprised of a similar porous ceramic material impregnated, respectively, with Pb and PbO₂. A lead-containing foil may be maintained in close contact with each of the electrodes as current collectors attached to the battery terminals.

5808445

METHOD FOR MONITORING REMAINING BATTERY CAPACITY

Aylor James H; Lepsch Mark A Charlottesville, VA, UNITED STATES assigned to The University of Virginia Patent Foundation

A complete energy management system for lead-acid batteries. The system is designed for deep discharge batteries in traction vehicle type applications such as electric wheelchairs, electric vehicles, golf carts, or industrial equipment, where more efficient use of lead-acid batteries during both the charging and discharging cycle is needed. This system utilizes current measurements, open circuit voltage measurements during the recovery from charging or discharging, and an adaptation calculation to account for variations in physical battery characteristics, battery treatment, battery environment, and battery aging.

FUEL CELL

5794732

APPARATUS AND METHOD FOR STARTING A FUEL CELL VEHICLE

Lorenz Helmu; Noreikat Karl-Ernst; Klaiber Thomas; Fleck Wolfram; Sonntag Josef; Hornburg Gerald; Gaulhofer Andreas Unterensingen, GERMANY assigned to Daimler-Benz Aktiengesellschaft

An apparatus and method for starting a vehicle which is driven by an electric drive unit supplied with electrical energy from a fuel cell. A compressor is arranged in the feed line of the fuel cell for the oxidant mass flow and is driven by an electric motor supplied with voltage from the fuel cell itself. For the purpose of starting the fuel cell, a starter motor is provided for driving the compressor which is fed from a 12 V starter battery. In

addition, a safety interrogation is initiated before starting the vehicle. The fuel cell is not run up to a prescribed no-load power with the aid of the starter motor until successful termination of the safety interrogation. The drive unit is then released after this no-load power has been reached.

5795496

POLYMER MATERIAL FOR ELECTROLYTIC MEMBRANES IN FUEL CELLS

Yen Shaio-Ping S; Narayanan Sekharipuram R; Halpert Gerald; Graham Eva; Yavrouian Andre Altadena, CA, UNITED STATES assigned to California Institute of Technology

A polymer, PEEK or SPES is processed to use it as a proton conducting membrane for a fuel cell. Asymmetric properties are formed.

5795502

ELECTRICALLY CONDUCTING CERAMICS, PROCESS FOR PRODUCING THE SAME AND FUEL CELL USING THE CERAMICS

Terashi Yoshitak; Shigehisa Takash; Akiyama Masahide; Yamashita Shoji Kokubu, JAPAN assigned to Kyocera Corporation

Electrically conducting ceramics having, as a chief crystalline phase, a perovskite crystalline phase containing La, Cr and Mg and further having, in addition to the chief crystalline phase, an oxide phase containing La, wherein when the atomic ratios among the rare earth element, Mg and Cr in said chief crystalline phase are represented by the following formula, (*See Patent for Tabular Presentation*) PS wherein R denotes rare earth elements at least part of which being La, the atomic ratios among the rare earth element, Mg and Cr contained in the whole ceramics are represented by the following formula, (*See Patent for Tabular Presentation*) PS wherein R, x to z are as defined above, and u and v are the numbers satisfying the following formulas, (*See Patent for Tabular Presentation*) PS (*See Patent for Tabular Presentation*) PS The ceramics is dense, exhibits excellent sintering property at low temperatures, has high electric conductivity, and remains stable in a reducing atmosphere.

5795665

FUEL CELL SUB-ASSEMBLY WITH A PLURALITY OF DIMPLES

Allen Jeffrey Naugatuck, CT, UNITED STATES assigned to Energy Research Corporation

A fuel cell sub-assembly having a cathode current collector, a cathode electrode, an electrolyte matrix, an anode electrode and an anode current collector arranged in a sandwich construction and provided with a plurality of rows of dimples. Adjacent rows of dimples extend in opposite directions from the sandwich construction and separator plates also with rows of dimples are arranged adjacent to the sandwich construction so as to form therewith channels for the fuel and oxidant gases. Also disclosed are unique separator plate configurations.

5795666

MODULAR POWER STATION FOR THE PRODUCTION PRIMARILY OF HYDROGEN FROM SOLAR ENERGY AND A METHOD OF GENERATING ELECTRIC ENERGY

Johnssen Wolf Munich, GERMANY assigned to Binsmaier nee Gallin-Ast Hannelore

PCT No. PCT/EP94/03766 Sec. 371 Date Jul. 10, 1996 Sec. 102(e) Date Jul. 10, 1996 PCT Filed Nov. 12, 1994 PCT Pub. No. WO95/15590 PCT Pub. Date Jun. 8, 1995. A modular power station for the production primarily of hydrogen from solar energy. A conversion module converts solar energy into biomass which is gasified in a gasification module and the hydrogen resulting from the gasification is separated out and stored. The hydrogen can be used for generating electrical energy in a fuel cell.

5795668

FUEL CELL INCORPORATING A REINFORCED MEMBRANE

Banerjee Shoibal Newark, DE, UNITED STATES assigned to E I du Pont de Nemours and Company

A fuel cell and a battery with a reinforced polymeric ion exchange membrane are disclosed. The membrane comprises (a) a porous support layer, preferably of fluorine-containing polymer, and (b) an ion exchange resin, preferably a fluorinated ion exchange layer(s)

supported on one or both sides of the porous support layer. The total thickness of the membrane is preferably from 20 to 500 μm . The membrane has low fuel crossover, high electric conductivity and high mechanical strength. The membrane may especially be used in a direct methanol fuel cell.

5795669

ELECTRODE

Wilkinson David; Voss Henry H; Prater Keith B; Hards Graham A; Ralph Thomas R;Thompsett David North Vancouver, CANADA assigned to Johnson Matthey Public Limited Company; Ballard Power Systems Inc

An electrode comprises a first catalytic component active at gas-phase reaction sites and a second catalytic component active at electrochemical reaction sites wherein each catalytic component is present either as a separate layer, or a single mixed layer or a combination of a separate layer and a single mixed layer. The electrode has an improved tolerance to poisons such as carbon monoxide and carbon dioxide.

5795670

POROUS SINTERED LANTHANUM MANGANITE BODIES AND METHOD OF MANUFACTURING THE SAME

Araki Kiyoshi; Nishioka Masao Nagoya, JAPAN assigned to NGK Insulators Ltd

A porous sintered lanthanum manganite body has an alkali metal content of at least 100 ppm and the alkali metal concentration in the lanthanum manganite crystal grains is higher adjacent the grain boundaries than away from the grain boundaries. The body is made by forming a shaped green body of material and firing the shaped green body, the sinterable material has a content of alkali metal of at least 100 ppm. The sintered body has improved strength, and is suitable for example as an air electrode of a solid oxide fuel cell.

5795671

FUEL CELL HAVING ELECTROLYTE LAYER HELD BETWEEN ANODE AND CATHODE

Nirasawa Hitoshi; Kawachi Takanori; Ogawa Takashi; Murata Kenji Yokohama, JAPAN assigned to Kabushiki Kaisha Toshiba

A fuel cell having a plurality of stacked single cells in each of which an electrolyte layer is held between an anode and a cathode and between which a separator is interposed, wherein the electrolyte layer includes a sheet for holding the electrolyte containing, as the main component thereof, fine powder having a function of holding the electrolyte, and reinforcing ceramic fiber disposed in the sheet for holding the electrolyte to substantially run parallel to the surface of the sheet for holding the electrolyte.

5795672

DIAMOND-LIKE CARBON BASED ELECTROCATALYTIC COATING FOR FUEL CELL ELECTRODES

Dearnaley Geoffrey San Antonio, TX, UNITED STATES assigned to Southwest Research Institute

The present invention provides a low-temperature method for producing electrocatalytic coatings for fuel cell electrodes. The electrocatalytic coating comprises a thin-film of diamond-like carbon doped with finely-dispersed catalytic agent, preferably platinum, platinum-ruthenium, or other catalytically active materials. The method may be scaled-up as a highly economical reel-to-reel process comparable to the manufacture of coated polymers for food packaging applications.

5798186

METHOD AND APPARATUS FOR COMMENCING OPERATION OF A FUEL CELL ELECTRIC POWER GENERATION SYSTEM BELOW THE FREEZING TEMPERATURE OF WATER

Fletcher Nicholas J; Boehm Gustav A; Pow Eric Vancouver, CANADA assigned to Ballard Power Systems Inc

A method and apparatus are provided for starting and operating an electric power generation system comprising an electrochemical fuel cell stack for supplying electric current to an external electrical circuit. The stack comprises at least one fuel cell comprising a membrane electrode assembly comprising an anode, a cathode, and a water permeable ion exchange membrane interposed between the anode and the cathode. A fuel stream and an oxidant stream are each flowable to the fuel cell. At least a portion of the membrane electrode

assembly has a temperature below the freezing temperature of water. The supply of electric current to the external circuit from the fuel cell stack is commenced such that the temperature of the membrane electrode assembly exceeds the freezing temperature of water.

5798187

**FUEL CELL WITH METAL SCREEN
FLOW-FIELD**

Wilson Mahlon; Zawodzinski Christine Los Alamos, NM, UNITED STATES assigned to The Regents of the University of California

A polymer electrolyte membrane (PEM) fuel cell is provided with electrodes supplied with a reactant on each side of a catalyzed membrane assembly (CMA). The fuel cell includes a metal mesh defining a rectangular flow-field pattern having an inlet at a first corner and an outlet at a second corner located on a diagonal from the first corner, wherein all flow paths from the inlet to the outlet through the square flow field pattern are equivalent to uniformly distribute the reactant over the CMA. In a preferred form of metal mesh, a square weave screen forms the flow-field pattern. In a particular characterization of the present invention, a bipolar plate electrically connects adjacent fuel cells, where the bipolar plate includes a thin metal foil having an anode side and a cathode side; a first metal mesh on the anode side of the thin metal foil; and a second metal mesh on the cathode side of the thin metal foil. In another characterization of the present invention, a cooling plate assembly cools adjacent fuel cells, where the cooling plate assembly includes an anode electrode and a cathode electrode formed of thin conducting foils; and a metal mesh flow field therebetween for distributing cooling water flow over the electrodes to remove heat generated by the fuel cells.

5798188

**POLYMER ELECTROLYTE MEMBRANE
FUEL CELL WITH BIPOLAR PLATE
HAVING MOLDED
POLYMER PROJECTIONS**

Mukohyama Atsushi; Takeda Toshihiko Yokohama, JAPAN assigned to E I duPont de Nemours and Company

A polymer electrolyte membrane fuel cell comprised of

polymer electrolyte membranes, gas diffusion electrodes that sandwich the membranes, and bipolar plates operating as gas separation plates and current collectors with fuel/oxidizing agent supply and discharge passages provided by projections on both of its surfaces. A bipolar plate is employed which comprises projections on the bipolar plate of a melt-processible polymer having good fluidity and a coating on the surfaces of the bipolar plate comprising metal, metal nitride or metal carbide.

5800798

**PROCESS FOR PRODUCING FUEL GAS
FOR FUEL CELL**

Ino Takashi; Seike Tadashi Yokohama, JAPAN assigned to Nippon Oil Co Ltd; Petroleum Energy Cent

A process of producing a fuel gas for fuel cells, which comprises the steps of: a) treating kerosine having a sulfur content not higher than 5 ppm with a desulfurizing agent to reduce the sulfur content of said treated kerosine to 0.2 ppm or less and b) contacting said treated kerosine from step a) with a steam reforming catalyst to provide a fuel gas mainly composed of hydrogen, said desulfurizing agent in step a) comprising a copper-nickel alloy having a copper to nickel ratio by weight of 80:20 to 20:80 and at least one carrier selected from the group consisting of Al₂O₃, ZnO and MgO, and the total content of copper and nickel in terms of metals in said desulfurizing agent being in the range of 40 to 70% by weight.

5800938

**SANDWICH-TYPE SOLID POLYMER
ELECTROLYTE FUEL CELL**

Watanabe Masahiro Kofu shi, Yamanashi, JAPAN assigned to Tanaka Kikinzoku Kogyo K K; Stonehart Associates Inc Watanabe Masahiro

Disclosed is a sandwich-type solid polymer electrolyte fuel cell comprising in sequence, a cathode current collector; a cathode electrically connected to the cathode current collector, said cathode containing an ion exchange resin and cathode catalyst particles in electrical communication with the cathode; an ion exchange membrane; an anode containing an ion exchange resin and anode catalyst particles in electrical communication with the anode; and an anode current collector electrically connected to the anode. The cathode and/or

anode contain, in the ion exchange resin, catalyst metals capable of promoting the reaction of hydrogen and oxygen gases to produce water. The catalyst metals are insulated electrically from the current collectors due to the presence of the ion exchange resin which has no electrical conductivity.

5803934

METHOD OF PRODUCING AN ELECTRODE LAYER ON A SOLID OXIDE ELECTROLYTE OF A SOLID STATE FUELCELL

Carter John David Roskilde, DENMARK assigned to Forskningscenter

PCT No. PCT/DK94/00304 Sec. 371 Date Feb. 20, 1996 Sec. 102(e) Date Feb. 20, 1996 PCT Filed Aug. 12, 1994 PCT Pub. No. WO95/05685 PCT Pub. Date Feb. 23, 1995. Vanadium doping has been found to increase the sinterability of $\text{La}_x\text{Ca}_y\text{CrO}_3$ ($x+y=1$) while retaining its high temperature electrical and chemical properties. Specimens of $\text{La}_x\text{Ca}_y\text{CrO}_3$ with about 2 mol % V were sintered at 1,300 degrees to 1,450°C for 2 to 8 hours to achieve more than 92% theoretical density, as compared to less than 75% for those specimens not containing V. The electrical conductivity of $\text{La}_{0.76}\text{Ca}_{0.26}\text{CrO}_3+2$ mol % V in 10-16 and 1 atm of O_2 , was measured to be 12 and 30 S/cm, respectively. Preliminary experiments with tape cast laminates and spray coated specimens give indication that $\text{La}_x\text{Ca}_y\text{CrO}_3+\text{V}$ can be sintered on YSZ with good adherence between the two materials.

5804325

NON POISONING FUEL CELL AND METHOD

Yopez Omar Short Hills, NJ, UNITED STATES assigned to Westfield Trading Corporation

This invention relates to an apparatus configuration and a method of operation for fuel cells that use as fuel any carbon compound. These cells are built with anodes capable of storing and diffusing hydrogen, where the complete oxidation of the carbon fuel to carbon dioxide occurs, and cathodes that use atmospheric oxygen as an oxidant. An aspect of the invention is the deliberate occlusion of hydrogen in the anode during the operation of the fuel cells, in order to eliminate or greatly reduce the poisoning of the electrocatalyst. Fuel cells according

to the invention will be more competitive with existing power sources in price, operational costs, power output, lifetime, volume and pollution emission. Implementation of the invention can also be used to upgrade old fuel cells and to detect and destroy carbon compounds in medical or pollution control applications.

5804328

CURRENT COLLECTING DEVICE FOR A FUEL CELL STACK

Odegard Rolf; Ravnanger Roald; Sundal Per Trondheim, NORWAY assigned to Den norske stats oljeselskap a s

PCT No. PCT/NO95/00114 Sec. 371 Date Mar. 24, 1997 Sec. 102(e) Date Mar. 24, 1997 PCT Filed Jun. 28, 1995 PCT Pub. No. WO96/00987 PCT Pub. Date Jan. 11, 1996. A current collecting device for a fuel cell stack comprising a number of stack-forming fuel cell plates between opposite end plates, each end plate being connected to a current collector. The current collector comprises a plate having one surface pressed against the associated end plate and being provided with a number of grooves extending across the a substantial part of the area of the plate. Wires are received in the grooves. The wires are covered with a layer of a noble metal that projects above the surface of the associated end plate and forms an electrical connection between the wires and the end plate.

5807642

SOLID OXIDE FUEL CELL STACKS WITH BARIUM AND STRONTIUM CERAMIC BODIES

Xue Liang An; Yamanis Jean; Donaldson Richar Lake Hiawatha, NJ., UNITED STATES

A ceramic body based on barium and strontium titanates has a composition defined essentially by the formula $\text{Ba}_{1-x}\text{Sr}_x\text{TiO}_3$, where x ranges from 0 to 1. The ceramic body is chemically and dimensionally stable in solid oxide fuel cell (SOFC) operation environments, which encounter oxidizing and reducing atmospheres at temperatures as high as 1,000°C In addition, the ceramic of which the body is comprised can be tailored to yield a ceramic in which the thermal expansion coefficient (CTE) is adjusted between $11.3 \times 10^{-6}/\text{degrees C.}$ and $12.4 \times 10^{-6}/\text{degrees C.}$ to match the CTE of the other SOFC materials, thereby avoiding the adverse effects of

thermal stress. These features make the ceramic body especially suited for use as manifolds in SOFC stacks, or other non-electrical structural components, such as the inflow and outflow gas manifold materials, the stack housing, or other support structure or spacers in the stack, and the like.

BATTERY MATERIALS

5797971

METHOD OF MAKING COMPOSITE ELECTRODE MATERIALS FOR HIGH ENERGY AND HIGH POWER DENSITY ENERGY STORAGE DEVICES

Zheng Jian-Ping; Jow T Richard Eatontown, NJ, UNITED STATES assigned to The United States of America as represented by the Secretary of the Army

This invention relates to a composite electrode material for use in high energy and high power density electrochemical capacitors, and to the electrochemical capacitor containing the electrodes. The electrodes are comprised of materials with high specific capacitance and electronic conductivity/high porosity. Specifically, the electrode is comprised of $\text{RuO}_2 \cdot x\text{H}_2\text{O}$ powder and carbon black or carbon fiber.

5798033

PROCESS FOR PREPARING POROUS METALLIC BODY AND POROUS METALLIC BODY FOR BATTERY ELECTRODESUBSTRATE PREPARED THEREFROM

Uemiya Takafumi; Tsuchida Hitosh; Furukawa Masayuki; Yamazaki Kazuo; Dohi Tadashi Shinminato, JAPAN assigned to Sumitomo Electric Industries Ltd; Sumitomo Electric Industries Toyama Co Ltd NipponGraphite Industries Ltd

A process for preparing a porous metallic body comprising the steps of: rendering a porous resin body electrically conductive, electroplating the conductive resin, and heating the electroplated resin to remove the resin, wherein the step of rendering the resin electrically conductive is conducted by coating the resin with a coating composition containing amorphous carbon

particles as a conductive material. In the process, substantially spherical carbon particles may be used as the conductive material. The substantially spherical carbon particles are still preferably amorphous carbon. The thus obtained porous metallic body has reduced defect and more smooth skeleton in the porous body, is less likely to cause stress concentration upon application of bending and tensile force, has lower carbon content, and superior mechanical strength, and, therefore, the substrate is suitable as an electrode substrate for batteries.

5798180

THIN FILM COMPOSITE MEMBRANE AS BATTERY SEPARATOR

Chowdhury Geeta; Adams William; Conway Brian; Sourirajan Srinivasa Ottawa, CANADA assigned to The University of Ottawa

The present invention relates to film composite membranes for use as battery separators or coatings on electrodes.

5798190

PROCESS FOR THE PREPARATION OF A CURRENT COLLECTOR IN CONTACT WITH THE CATHODE MATERIAL

Andrei Maria; Capuano Federico; Mercuri Sandro Berceto, ITALY assigned to Eniricerche S p A; Olivetti Personal Computer

Process for the preparation of a current collector in contact with the cathode material in light rechargeable solid state batteries, characterized by the fact that it includes the deposition on a nickel layer having a rugosity R_a from 1 to 3 microns of a cathode paste comprising 1) a powder of active cathode material; 2) an electronic conductor; 3) a polymeric composition comprising: 3a) a polymer deriving from the polymerization of a mixture of a vinyl ether and a divinyl ether; 3b) lithium salts, selected from LiBF_4 alone or in a mixture with other salts; 3c) optionally, a plasticizer selected from dipolar aprotic solvents and polyethers with a low molecular weight and their relevant mixtures.

5807645**DISCHARGE PROMOTER MIXTURE FOR REDUCING CELL SWELLING IN ALKALI METAL ELECTROCHEMICAL CELLS**

Takeuchi Esther; Thiebolt William C East Amherst, NY, UNITED STATES assigned to Wilson Greatbatch Ltd

An electrode comprising acetylene black or carbon black carbonaceous diluent having a surface area less than about 100 m²/gram mixed with graphite and a charge transfer active material to provide an electrode active admixture, is described. The carbonaceous diluent/graphite blend increases the charge transfer capability within the electrode while exhibiting diminished cell swelling in comparison to high surface area carbonaceous diluents. A preferred carbonaceous diluent is SHAWINIGAN BLACK trademark carbon.

LITHIUM BATTERIES**5795558****POSITIVE ELECTRODE ACTIVE MATERIAL FOR LITHIUM SECONDARY BATTERY METHOD OF PRODUCING**

Aoki Takashi; Nagata Mikito; Tsukamoto Hisashi Kyoto, JAPAN assigned to Japan Storage Battery Company Ltd

A positive electrode active material for a lithium secondary battery is made of $\text{LiNi}_{1-x-y-z}\text{Co}_x\text{Mn}_y\text{Al}_z\text{O}_2$, in which x, y and z satisfy relations of $0 < x < 0.3$, $0 < y < 0.25$, $0 < z < 0.15$.

5795677**NON-AQUEOUS ELECTROLYTE AND LITHIUM SECONDARY BATTERY**

Yamamoto Taketsugu; Miura Hitoshi Ibaraki, JAPAN assigned to Sumitomo Chemical Company Limited

The present invention provides a non-aqueous electrolyte that includes a non-aqueous solvent and a

lithium salt. The non-aqueous electrolyte contains a halogen-substituted ether compound represented by the general formula (I): (*See Patent for Tabular Presentation*) PS wherein R1 is an alkyl or halogen-substituted alkyl group having 2 or less carbon atoms and R2 is a halogen-substituted alkyl group having 2 to 10 carbon atoms. Additionally, the non-aqueous electrolyte contains at least one compound that is capable of dissolving the lithium salt in an amount of not less than 0.5 mol/liter. When this compound is added to the halogen-substituted ether compound, a mixed solvent is formed that is used as the non-aqueous solvent. The present invention also provides a lithium secondary battery that comprises a cathode that can be doped/undoped with lithium ions, an anode of a lithium metal or alloy or an anode that can be doped/undoped with lithium ions, and the non-aqueous electrolyte described above. A lithium secondary battery that uses the non-aqueous electrolyte of the present invention is superior in cycle life, in repeating charging/discharging and low-temperature capacity, is particularly superior in high-rate capacity, and causes little deterioration of high-rate capacity due to cycles.

5795678**NEGATIVE ELECTRODE FOR USE IN LITHIUM SECONDARY BATTERY AND PROCESS FOR PRODUCING THE SAME**

Takami Norio; Ohsaki Takahisa; Tamaki Toshio; Nakajima Hideyuki; Katsuta Yasushi Yokohama, JAPAN assigned to Kabushiki Kaisha Toshiba; Petoca Ltd

A negative electrode for use in a secondary battery which comprises milled graphite fibers derived from mesophase pitch each having circumferential, upper end and lower end faces, the milled graphite fibers each being composed of graphite layers having therebetween voids as inlets and outlets for lithium ions, all of the circumferential, upper end and lower end faces having openings of the voids between the graphite layers, which serve as inlets or outlets for lithium ions. This negative electrode for use in a secondary battery can be utilized to provide a lithium secondary battery of nonaqueous electrolyte which has large charge and discharge capacities and which permits setting the current density at charge or discharge high.

5795679**LITHIUM SECONDARY CELL WITH AN ALLOYED METALLIC POWDER CONTAINING ELECTRODE**

Kawakami Soichiro; Mishina Shinya; Kobayashi Naoya; Asao Masaya Nara, JAPAN assigned to Canon Kabushiki Kaisha

In Lithium secondary cells, alkali secondary cells and bromine-zinc secondary batteries capable of retarding the growth of a dendrite, which would occur at the time of charging thereof and result in performance degradation, and having high energy densities and long cycle lives, a method for forming a material of a negative electrode of such a secondary cell or battery and a method for handling the material of the negative electrode are provided. The secondary cell or battery is provided with positive and negative electrodes separated from each other by a separator in an electrolyte contained in a case. The negative electrode is made of metallic powder alloyed with at least an amphoteric metal which reacts with both of an acid and an alkali.

5795680**NON-AQUEOUS ELECTROLYTE TYPE SECONDARY BATTERY**

Ikeda Katsuji; Hiratsuka Kazuya; Morimoto Takeshi; Matsumoto Shinji Tokyo, JAPAN assigned to Asahi Glass Company Ltd; Elna Company Ltd

A non-aqueous electrolyte type secondary battery comprises a negative electrode capable of occluding and releasing lithium, a positive electrode capable of occluding and releasing lithium, a non-aqueous electrolyte which contains a lithium salt, and a container for accommodating the negative electrode, the positive electrode, and the electrolyte. The negative electrode is formed by pressing a foam metal or a fibrous sintered metal which contains nickel as a principal component thereof and which is filled with a mixture of a binder and a carbon material capable of occluding and releasing lithium. The negative electrode has a thickness of not less than 0.1 mm and a porosity of 20 to 50%.

5798191**POLYMER ELECTROLYTE LITHIUM BATTERY CONTAINING A POTASSIUM SALT**

Choquette Yves; Armand Michel; Simoneau Martin; Gagnon Renacu e BelangerAndracu e Ste Julie, CANADA assigned to Hydro-Quebec

In a rechargeable lithium battery including inter alia a lithium anode, a lithium ion reducible cathode bonded with a polymer, as well as a polymer electrolyte, potassium ions are introduced either in the cathode or in the electrolyte, or in both of them at the same time, so that potassium is distributed in the cathode and the electrolyte when the generator has reached equilibrium. This has the effect of stabilizing the performances of the battery during cycling in terms of energy and power.

5804333**COIN SHAPED LITHIUM BATTERY**

Shioda Masatsugu; Miyoda Koichi Fukushima, JAPAN assigned to Sony Corporation

A coin-shaped lithium battery is disclosed. The coin-shaped lithium battery comprises a battery can containing therein an anode pellet composed of lithium or lithium alloy and a cathode pellet which are arranged to face each other with a separator provided between the pellets. At least one of the anode pellet and the cathode pellet has its central part swollen to form a curved surface. The battery can is elastically deformed to be aligned with the curved surface. In the coin-shaped lithium battery, total height of the anode pellet and the cathode pellet in outer rim part is smaller than total height in central part by 4 to 12%.

5804335**LITHIUM SECONDARY BATTERY**

Kamauchi Masahiro; Takada Yoshinori Itami, JAPAN assigned to Mitsubishi Cable Industries Ltd

PCT No. PCT/JP95/02397 Sec. 371 Date May 27, 1997 Sec. 102(e) Date May 27, 1997 PCT Filed Nov. 24, 1995 PCT Pub. No. WO96/17392 PCT Pub. Date Jun. 6, 1996. A lithium secondary battery comprising a positive electrode composed of a positive electrode active material comprising an oxide compound comprising at least Li and Ni, and a negative electrode comprising an Li-Ag-Te alloy, a positive electrode active

material for a lithium secondary battery, which is composed of an oxide compound represented by the formula: $\text{LiNi}_w\text{Al}_x\text{PyO}_z$ wherein $0.80 < w < 1.10$, $0 < x < 0.015$, $0 < y < 0.03$ and $1.8 < z < 2.2$, and a lithium secondary battery comprising said positive electrode active material. The lithium secondary battery of the present invention shows large charge-discharge capacity, high energy density, less degradation by the repetitive charge-discharge and is superior in cycle property. The positive electrode active material of the present invention, which is composed of an oxide compound represented by the formula: $\text{LiNi}_w\text{Al}_x\text{PyO}_z$ is economical and superior in the supply of starting materials, and the lithium secondary battery comprising said positive electrode active material is advantageous in that it has high capacity, is superior in cycle property and can be prepared stably at low costs.

5804442

**PROCESS FOR PREPARING
MACROPHAGES, KITS, AND
COMPOSITION FOR THE USE OF THIS
PROCESS**

Romet-Lemonne Jean-Loup; Chokri Mohamed Paris, FRANCE assigned to I D M Immuno-Designed Molecules

The invention relates to a process for preparing a composition comprising macrophages, optionally activated, and/or cells derived from monocytes with a strong potential for antigen presentation, said process comprising a stage of culture of monocytes present in the starting composition, this stage being preceding and/or followed by a stage of elimination of all or part of the constituents other than the monocytes present in the starting composition, with the aid of antibodies directed against said constituents, and/or followed by a stage of elutriation. The invention also concerns the compositions of kits for reducing this process to practice.

5807532

**METHOD OF PRODUCING SPINEL TYPE
LiMn2O4**

Takahashi Koh; Sotomura Takesh; Satoh Keiji Ibaraki, JAPAN assigned to Japan Metals and Chemicals Co Ltd

PCT No. PCT/JP96/00136 Sec. 371 Date Sep. 24, 1996 Sec. 102(e) Date Sep. 24, 1996 PCT Filed Jan. 25, 1996

PCT Pub. No. WO96/22943 PCT Pub. Date Aug. 1, 1996. As a technique of stably producing a crystalline spinel type LiMn_2O_4 having a large specific surface area by microscopically uniform mixing at atomic level of constitutional elements without causing crystal defects, there is proposed a method wherein water-soluble lithium salt and manganese nitrate ($\text{Mn}(\text{NO}_3)_2$) are dissolved in water and then non-ion water-soluble high polymer containing no metal ion is added as a cation carried body to the resulting aqueous mixed solution and thereafter water is removed from the aqueous mixed solution under heating, preferably at a temperature of not lower than 100°C to synthesize crystalline spinel type LiMn_2O_4 .

5807646

**SPINEL TYPE LITHIUM-MANGENESE
OXIDE MATERIAL, PROCESS FOR
PREPARING THE SAME AND
USE THEREOF**

Iwata Eiichi; Takahashi Ken-ich; Yoshida Setsuo; Okada Masaki; Sawano Masanori Yamaguchi ken, JAPAN assigned to Tosoh Corporation

A novel lithium-manganese oxide composition suitable for use in lithium secondary batteries as an active material for positive electrodes, said oxide having a spinel type crystal structure, an Li:Mn molar ratio of 0.9-1.10:2.00, a mean Mn oxidation number of 3.40-3.60 valencies, and a BET specific surface area of at least $1 \text{ m}^2/\text{g}$, substantially all the primary particles of said oxide being less than $1 \mu\text{m}$; a process for preparing such an oxide and a lithium secondary battery containing such an oxide are also disclosed.

NICKEL METAL HYDRIDE BATTERIES

5798189

**NICKEL-HYDROGEN SECONDARY
BATTERY**

Hayashida Hiroataka; Teraoka Hirohito; Ono Tomoyuki; Soeda Tsuyoshi; Yamamoto Masaaki Fujisawa, JAPAN assigned to Kabushiki Kaisha Toshiba; Toshiba Battery Co Ltd

A nickel-hydrogen secondary battery is disclosed wherein a long life is assured, an improved

self-discharging property in a high temperature storage and the inhibition of increase in inner pressure of the battery in the occasion of over-charging can be realized. The nickel-hydrogen secondary battery comprises, a case, a paste-type positive electrode accommodated in the case and containing nickel hydroxide and a polymeric binder, a paste-type negative electrode accommodated in the case and containing a hydrogen-absorbing alloy and a polymeric binder, a separator accommodated in the case in so as to be interposed between the positive and negative electrodes, and an alkali electrolyte accommodated in the case. The separator is formed of a sheet material containing polyolefin-based synthetic resin fibers and has a hydrophilic first surface and a second surface having hydrophilic and hydrophobic portions, the separator is interposed between the positive and negative electrodes with the second surface facing toward the negative electrode.

5804334

**ALKALINE STORAGE BATTERY AND
METHOD FOR PRODUCING POSITIVE
ELECTRODE THEREOF**

Yamamura Yasuharu; Katsumoto Masumi; Kaiya Hideo Kanazawa, JAPAN assigned to Matsushita Electric Industrial Co Ltd

The present invention provides an alkaline storage battery comprising a positive electrode containing a nickel hydroxide active material and a compound oxide in a range of 2 wt % to 30 wt % to the amount of the nickel hydroxide. The compound oxide contains at least one transition metal element and at least one rare earth element or alkaline earth metal element. The compound oxide has conductivity of 10-2 S/cm or higher at 25°C and stability in an alkaline electrolyte. Consequently, the alkaline storage battery shows excellent characteristics in a long-term preservation at a high temperature, capacity restoration, and charge/discharge cycle life.

5800947

**GASTIGHT, SEALED ALKALINE
STORAGE BATTERY IN THE FORM OF A
BUTTON CELL**

Kumler Uwe; Klaus Christoph; Hofmann Guntlunter; Lichtenberg Frank Kelkheim, GERMANY assigned to Varta Batterie Aktiengesellschaft

A Ni/Cd or Ni/hydride storage battery of the button cell type has a positive electrode tablet based on a nickel hydroxide powder having an active mass comprised of spherical particles with a high pycnometric density ($d > 3.5 \text{ g/cm}^3$). In contrast to conventional nickel hydroxide powders having irregular particles, a better space utilization is achieved during dry pressing due to a narrow particle-size distribution having a maximum in a range of from 5 to 20 μm , and due to the rounded particle surfaces. The specific volumetric capacity of the resulting button cell electrode is consequently approximately 25% higher than that of a conventional positive button cell electrode. A microporous separator having pore sizes smaller than the mean diameter of the spherical particles prevents the danger of short circuits

5807643

**NICKEL-HYDROGEN SECONDARY
BATTERY**

Yamamoto Masaaki; Hayashida Hirota; Ono Tomoyuki Inzai, JAPAN assigned to Kabushiki Kaisha Toshiba; Toshiba Battery Co Ltd

A nickel-hydrogen secondary battery comprising, a positive electrode containing nickel hydroxide, a negative electrode containing a hydrogen-absorbing alloy, a separator interposed between the positive electrode and the negative electrode and containing olefin-containing-polymer based fibers having an ion-exchange group, and an alkaline electrolyte having a normality of 5 or more in concentration, wherein the separator satisfies the following equation (1): (*See Patent for Tabular Presentation*) PS where X is a chemical equivalent of alkaline electrolyte per 1 Ah of battery capacity (meq/Ah) and Y is an ion-exchange capacity of the separator per 1 Ah of battery capacity (meq/Ah).

COMPONENTS AND/OR CHARGERS

5798934

**BATTERY REMAINING CAPACITY
MEASURING DEVICE**

Saigo Tsutomu; Shimoyama Kenichi Susono, JAPAN assigned to Yazaki Corporation

A current/voltage detecting section detects current flowing through a load and terminals voltage of a battery. A correlation determining section obtains the

correlation coefficient between a plurality of current values and a plurality of voltage values detected by the current/voltage detecting section to determine whether or not the correlation coefficient is equal to or less than the predetermined value. A data acquisition range determining section determines a data acquisition range adjacent to the previous approximating line stored in a memory when the predetermined values is determined as equal to or less than the predetermined value, and deletes data which are not included in the data acquisition range from the plurality of the current values and the plurality of the voltage values detected by the current/voltage detecting section. An approximating line calculating section calculates the approximating line to be stored in the memory based on a plurality of current values and a plurality of voltage values determined by the data acquisition range determining section. A remaining capacity calculating section calculates the remaining capacity of battery based on the plurality of the current values and the plurality of the voltage values determined by the data acquisition range determining section.

5801514

CHARGING-AND-DISCHARGING CONTROL DEVICE, A BATTERY PACK, AND AN ELECTRONIC APPARATUS WITH IMPROVED CHARGE AND DISCHARGE CONTROL

Saeki Mituo; Yano Hidetoshi; Ozawa Hidekiyo
Kawasaki, JAPAN assigned to Fujitsu Limited

A charging-and-discharging device in an electronic apparatus includes a rechargeable battery and a charging device for charging the battery. The charging-and-discharging device includes a switching circuit electrically isolating one terminal side of the battery from a ground side of the electronic apparatus. The charging-and-discharging device further includes a charge control section controlling the isolating of the one terminal side of the battery from the ground side of the electronic apparatus by turning off the switching circuit during charging of the battery. In the charging-and-discharging device, the one terminal side of the battery is isolated from the ground side of the electronic apparatus by the switching circuit during charging of the battery and a closed loop including the charging device and the battery is established to charge the battery.

5801515

METHOD AND APPARATUS FOR ULTRARAPIDLY CHARGING A BATTERY

Chen Shu; Chen Yang Zhuhai Guangdong, Province
519000, CHINA

PCT No. PCT/CN95/00094 Sec. 371 Date Jul. 30, 1997
Sec. 102(e) Date Jul. 30, 1997 PCT Filed Nov. 27, 1995
PCT Pub. No. WO96/17427 PCT Pub. Date Jun. 6,
1996. A method and apparatus for ultrarapidly charging
primary or secondary battery. Charging current is
multiple-frequency complex pulse current which is
comprised of pulse current overlapped by pulse current
with at least two different frequency band and arbitrary
waveform and opposite narrow pulse whose amplitude
is three times higher than amplitude of said pulse
current. The charging current may be larger than 1.5C10
and charging is performed in a manner of no
discharging. Charging circuit is comprised of at least
two different frequency oscillators, switch circuit and
opposite narrow pulse generating circuit. The pulse
current of different frequency may overlap each other,
modulated and scanned and varied on frequency to
generate multiple-frequency complex charging current.

5808443

BATTERY CHARGING METHOD

Lundstrom John Glendora, CA, UNITED STATES

A backup battery charger measures charging capacitor
voltage and charging battery current to calculate battery
charging circuit resistance and open circuit float battery
voltage. Microcontroller computation of the backup
battery float battery voltage and battery charging circuit
resistance changes enable efficient charging and
monitoring of battery conditions.

5808444

CHARGING-AND-DISCHARGING DEVICE, BATTERY PACK AND ELECTRONIC APPARATUS INCLUDING THEM

Saeki Mituo; Ozawa Hidekiyo; Kubo Takeshi
Kawasaki, JAPAN assigned to Fujitsu Limited

A charging-and-discharging device in an electronic
apparatus includes a rechargeable battery and a charging
device for charging the battery. The
charging-and-discharging device includes a switching

circuit electrically isolating one terminal side of the battery from a ground side of the electronic apparatus. The charging-and-discharging device further includes a charge control section controlling the isolating of the one terminal side of the battery from the ground side of the electronic apparatus by turning off the switching circuit during charging of the battery. In the charging-and-discharging device, the one terminal side of the battery is isolated from the ground side of the electronic apparatus by the switching circuit during charging of the battery and a closed loop including the charging device and the battery is established to charge the battery.

5808446

CHARGING CONTROL APPARATUS

Eguchi Yasuhito Kanagawa, JAPAN assigned to Sony Corporation

A battery charging control apparatus for controlling charging of a secondary battery has a FET which is so controlled that the supply of a charging current is suspended after being forcibly supplied to the secondary battery for a predetermined charging time, when the voltage of the secondary battery has risen to a level equal to or higher than a predetermined reference voltage, and, after the battery voltage has come down to the reference voltage during the suspension of the supply of the charging current, forced supply of the charging current is commenced again, thus realizing intermittent charging. The FET also is so controlled as to vary the above-mentioned charging time in accordance with the progress of charging of the secondary battery.

5808447

PULSE CHARGING METHOD FOR RECHARGEABLE BATTERIES

Hagino Tomohisa Sumoto, JAPAN assigned to Sanyo Electric Co Ltd

This charging method repeatedly charges and suspends charging to pulse charge a rechargeable battery. Open circuit battery voltage is measured during periods of suspended charging and charging is resumed when the measured voltage drops below a specified voltage. When the period of suspended charging is longer than a specified time, open circuit battery voltage is compared to a minimum voltage. When the open circuit battery voltage is greater than the minimum voltage and the

period of suspended charging is longer than the specified time, the battery is considered fully charged. When the open circuit battery voltage is less than the minimum voltage, even though the period of suspended charging is longer than the specified time, the battery is assumed to be removed from the system.

OTHER BATTERIES

5795357

ELECTRODE MANUFACTURING METHOD FOR RECHARGEABLE BATTERIES

Kim Jin-soo Kyungki do, KOREA assigned to Samsung Display Devices Co Ltd

Disclosed is an electrode manufacturing method for rechargeable batteries which includes the process of coating a binder on positive and negative electrodes of a rechargeable battery, wherein the process of coating is realized by passing positive and negative electrodes through rollers, mounted facing each other and which receive a supply of aqueous binder for application.

5795667

METAL-AIR CATHODE CAN, AND ELECTROCHEMICAL CELL MADE THEREWITH

McKenzie Rodney Stuart; Dopp Robert Madison, WI, UNITED STATES assigned to Rayovac Corporation

This invention pertains to metal-air electrochemical cells wherein one or more air entry ports is located in the bottom of the cathode can, to provide for entry of oxygen-rich air into the cathode can, where the oxygen participates in the chemical reaction whereby the cell produces electrical energy. In this invention, multiple small air entry ports are provided. Generally, the use of multiple ports distributed over the bottom of the cathode can, opposite the reaction surface of the cathode assembly, while not increasing the overall open area of the ports, results in an increase in the ratio of the cell limiting current to the rate at which moisture is lost from the cell. Accordingly, moisture loss as a function of electrical energy produced, is reduced. Preferred embodiments of the air entry ports have a stepped cross-sectional opening that provides a larger diffusion

area controlling diffusion of air into and out of the cell through a covering tab prior to the cell being put into use, and a smaller untabbed diffusion area controlling diffusion of air into and out of the cell when the cell is in use.

5795673

METHOD OF RECOVERING USEFUL MATERIALS FROM SPENT SECONDARY BATTERIES FOR ELECTRIC VEHICLES

Miyagawa Hiroshi; Shirai Ryouichi Ageo, JAPAN assigned to Mitsui Mining & Smelting Co Ltd

A method of recovering useful materials from spent secondary batteries for electric vehicles according to the present invention involves a step of cutting a spent secondary battery for electric vehicles into a cover portion and a housing portion, a step of taking out and separating electrode plates from the housing portion, and a step of crushing the electrode plates and dividing the crushed materials into negative electrode substrate, positive electrode plates including a nickel compound and active materials, and separators through the use of pneumatically separating and sieving.

5795674

BATTERY HAVING IMPROVED SAFETY FEATURES

Shiota Masatsugu Fukushima, JAPAN assigned to Sony Corporation

An improved safety battery exhibiting excellent safety features and capable of preventing ejection and spraying of the contents thereof when the safety valve has been ruptured, and having a safety valve which cannot be pierced unintentionally or intentionally by a child or the like is provided. In a preferred embodiment, a cylindrical nonaqueous-electrolyte battery is provided including a safety valve and a battery cover arrangement defining first and second venting cavities which are disposed under cover, to reduce or eliminate direct spraying discharge of the battery contents and to prohibit outside access to venting openings.

5795676

BATTERY

Kim Kang-jae; Choi Su-suk Suwon, KOREA assigned to Samsung Display Devices Co Ltd

A battery assembly having an improved case, simplifying manufacture, includes a tubular case having an internal space, an open end, a closed end, a cell element in the internal space of the case, and a cap closing the open end of the case, wherein the internal sectional dimension of the case is largest at the open end and smallest at the closed end while the external dimensions of the case are uniform. The change in internal dimensions may be provided by a tapering thickness of the case. Because of the tapered opening within the case, the cell element is easily inserted into the case.

5800857

ENERGY STORAGE DEVICE AND METHODS OF MANUFACTURE

Ahmad Nazir; Tsai Keh-Chi San Jose, CA, UNITED STATES assigned to Pinnacle Research Institute Inc

PCT No. PCT/US95/03985 Sec. 371 Date Sep. 30, 1996 Sec. 102(e) Date Sep. 30, 1996 PCT Filed Mar. 30, 1995 PCT Pub. No. WO95/26833 PCT Pub. Date Oct. 12, 1995. A dry preunit includes a plurality of cells in a true bipolar configuration, which are stacked and bonded together, to impart to the device an integral and unitary construction. Each cell includes two electrically conductive electrodes that are spaced apart by a predetermined distance. The cell also includes two identical dielectric gaskets that are interposed, in registration with each other, between the electrodes, for separating and electrically insulating these electrodes. When the electrodes and the gaskets are bonded together, at least one fill gap is formed for each cell. Each cell also includes a porous and conductive coating layer that is formed on one surface of each electrode. The coating layer includes a set of closely spaced-apart peripheral microprotrusions, and a set of distally spaced-apart central microprotrusions. These microprotrusions impart structural support to the cells, and provide additional insulation between the electrodes. An energy storage device such as a capacitor, is created with the addition of an electrolyte to the gap of the dry preunit and subsequent sealing of the fill ports. Organic polymers in organic solvents are used to seal the edges of electrodes of porous metal oxides, metal nitrides, or metal carbides to reduce or eliminate leakage current. The preparation of metal nitrides and metal carbides are claimed for electrode use.

5800865**THIN PROFILE BATTERY WITH
IMPROVED SEPARATOR AND GASKET
CONSTRUCTION**

Blonsky Peter M; Tuttle Mark Boise, ID, UNITED STATES assigned to Micron Communications Inc

A button-type battery has an anode, a cathode, and an electrolyte encased with two terminal housing members. The terminal housing members have respective peripheries that are crimped together to form a fluid-tight seal. An insulating gasket is provided between the peripheries to electrically insulate the two terminal housing members. A porous separator physically separates the anode and cathode and extends between the terminal housing member peripheries at least partially into the fluid-tight seal. According to one aspect, the separator overlaps the gasket in the seal. According to another aspect, the separator and gasket are formed of a single, integral piece of material.

5800939**BATTERY AND METHOD FOR THE
MANUFACTURE OF SUCH A BATTERY**

Mishina Shinya; Kawakami Soichiro; Kobayashi Naoya; Asao Masaya Kawasaki, JAPAN assigned to Canon Kabushiki Kaisha

The object of the present invention is to provide a secondary battery that has a lamination of negative electrodes and positive electrodes with intervening separators that acquires a low battery internal impedance and excellent charging and discharging power by the sufficient compressing of the electrodes, and that is very safe and easy to recycle, and to provide a method for manufacturing such a battery. To achieve the above object, according to the present invention, in a battery wherein positive electrodes and negative electrodes are disposed with intervening separators, and are stored in a battery housing with a solid electrolyte or an electrolyte solution, provided in the battery housing is a member whose shape is changed at a predetermined temperature (first temperature), which is lower than the melting point of the separator that maintains the shape in the battery operating temperature range. By heating or cooling the member to the first temperature, pressure is applied to at least one part of the battery housing or the applied pressure is released.

5800943**THIN PROFILE BATTERY WITH
IMPROVED SEPARATOR AND GASKET
CONSTRUCTION**

Blonsky Peter M; Tuttle Mark Boise, ID, UNITED STATES assigned to Micron Communications Inc

A button-type battery has an anode, a cathode, and an electrolyte encased with two terminal housing members. The terminal housing members have respective peripheries that are crimped together to form a fluid-tight seal. An insulating gasket is provided between the peripheries to electrically insulate the two terminal housing members. A porous separator physically separates the anode and cathode and extends between the terminal housing member peripheries at least partially into the fluid-tight seal. According to one aspect, the separator overlaps the gasket in the seal. According to another aspect, the separator and gasket are formed of a single, integral piece of material, where the peripheral edge of the separator/gasket extend beyond the seal.

5800944**THIN PROFILE BATTERY WITH
IMPROVED SEPARATOR AND GASKET
CONSTRUCTION**

Blonsky Peter M; Tuttle Mark Boise, ID, UNITED STATES assigned to Micron Communications Inc

A button-type battery has an anode, a cathode, and an electrolyte encased with two terminal housing members. The terminal housing members have respective peripheries that are crimped together to form a fluid-tight seal. An insulating gasket is provided between the peripheries to electrically insulate the two terminal housing members. A porous separator physically separates the anode and cathode and extends between the terminal housing member peripheries at least partially into the fluid-tight seal. According to one aspect, the separator overlaps the gasket in the seal. According to another aspect, the separator and gasket are formed of a single, integral piece of material.

5800945**SEALED ONE-PIECE BATTERY HAVING
AN ALKALINE ELECTROLYTE**

Grivel Trista; Verhoog Roelo Bordeaux, FRANCE assigned to Saft

The present invention relates to a sealed one-piece battery having an alkaline electrolyte and comprising a container made of at least two mutually-cooperating parts suitable for being bonded together by contact heat-fusion and made of a thermoplastic material comprising an alloy of at least two polymers, including not less than 50% of a first polymer selected from polyamide 6 and polyamide 6-6; and not more than 50% of a second polymer selected from polyethylene, polypropylene, and copolymers thereof; said material having permeability to hydrogen no greater than 400 cm³/m² 0.24 h.

5803933

PROCESS FOR THE PRODCUTION OF PRISMATIC ALKALINE ACCUMULATOR CELLS

Kilb Manfred Frankfurt am Main, GERMANY assigned to Christoph Emmerich GmbH & Co KG

A process for the production of prismatic alkaline accumulator cells of rectangular cross-section, wherein firstly an electrode unit comprising positive and negative electrodes with interposed separators and a cover of plastic material is produced. The cover has a feed through arrangement and connecting contacts for the electrodes. After the casing of the plastic material is filled with a measured amount of electrolyte, the electrode unit is lowered step wise and with pauses into the casing in such a way that the dry electrode pack can become fully impregnated by absorption without electrolyte issuing from the casing. When the cover is then fitted on the casing, the two parts are welded together to afford absolute sealing integrity. In order to reduce possible, even high increased pressure due to improper handling the cover contains a shaped recess, a rubber pin that covers over a bore in the cover leading into the interior of the casing, and a plastic ball that is pressed into the recess in the cover and fixes the rubber pin in place. In the event of a slightly increased pressure, the rubber pin first lifts off the bore and allows gas to escape to the exterior. In the event of a very high and sudden increase in pressure, the rubber pin and the ball are thrown out.

5804329

ELECTROCONVERSION CELL

Amendola Steven Ocean, NJ, UNITED STATES assigned to National Patent Development Corporation

Boron redox species can provide electrochemical cells for battery or energy storage systems that are characterized by favorable specific energy, energy density, capital and operating cost, recharge efficiency, safety, environmental impact, serviceability and longevity.

5804330

PACKAGED ELECTRODE PLATE FOR SECONDARY BATTERY WITH NONAQUEOUS ELECTROLYTE

Miyazaki Yuichi; Miyanowaki Shin; Sato Yasushi; Shindo Tadafumi; Umeda Kazuo Tokyo to, JAPAN assigned to Dai Nippon Printing Co Ltd

A packaged electrode plate for a secondary battery with a nonaqueous electrolyte comprises: an airtight container having a winding core and a tape pulling-out opening; and a wound tape comprising an electrode plate for a secondary battery with a nonaqueous electrolyte. The wound tape is stored in the airtight container and supported on the winding core thereof. A forward end of the wound tape is pulled out from the tape pulling-out opening of the airtight container, and the tape pulling-out opening is hermetically closed by means of an airtight sealing means which holds the forward end of the wound tape pulled out from the tape pulling-out opening.

5807411

METHOD OF MAKING A PHOTO-RECHARGEABLE STORAGE BATTERY

Kuriyaki Hisao; Hirakawa Kazuyoshi; Nomiya Teruaki Fukuoka, JAPAN assigned to Kyushu University

A method of manufacturing a photo-rechargeable storage battery includes cutting a filter paper of glass fiber as a base material in a preselected shape to provide a cut filter paper; washing the cut filter paper; coating a polypyrrole film on at least a portion of a surface of the cut filter paper; and carrying a gel of poly-tungstic acid having a form of clusters on at least a portion of the glass fiber coated with the polypyrrole film thereby forming a composite electrode on the filter paper.



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