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LEAD ACID**5905002****LEAD ACID STORAGE BATTERY**

Lund David L; Kump William H; Willing Rodger Minneapolis, West St. Paul, Batavia, IL, UNITED STATES assigned to GNB Technologies Inc

A lead acid storage battery and improved method of bonding battery cell terminal posts to cover bushings is disclosed. The battery cell terminal posts are made of lead alloy material and the cover bushings are made of solder alloy material having a significantly lower melting point than the terminal posts. The bushings are bonded to the terminal posts by heating the terminal posts and bushings to a temperature above the melting point of the material of the bushing, but below the melting point of the material of the post, to effect a secure and leak proof connection without melting of the terminal posts and with lesser chance for damage to the plastic cover. The plastic cover further includes integrally formed annular mold sections in the form of upstanding bosses which completely surround respective bushings and posts to contain melted material of the bushing during the heating operation and to form the terminals into final shape.

5906899

**SEALED STORAGE BATTERY HAVING
ELECTRODE PLATE FOOT WHICH RESTS
ON A RIB AND COVER JOINT
STRUCTURE WITH HIGH ADHESIVE
STRENGTH**

Noda Muneyoshi; Uchida Yasuhiko; Onoda Yukihiro; Sugiyama Hiroshi Toyohashi, Fujisawa, Chigasaki, Nakagun, JAPAN assigned to Matsushita Electric Industrial Company, Ltd

A sealed lead acid storage battery includes a monoblock container, a cover, plural assembly elements, each assembly element comprising a plurality of positive and negative electrode plates that are stacked via separators in a predetermined direction, a positive and negative electrode strap, and a positive and negative electrode terminal. The positive and negative electrode terminals protrude above the cover. The container further comprises ribs formed inside a bottom surface thereof for enabling the electrode plates to rest on the ribs. Each positive electrode plate has a pair of feet that are formed on a lower end thereof in a substantially symmetrical arrangement and further comprises a lug connected to the positive electrode strap that is disposed at a position shifting either to the left or to the right. One of the feet correspond to the position having the lug not resting on any rib, while the other foot rests on a rib. The storage battery further comprises a projection formed on an end face of the opening of one of the container and the cover and a recess formed in an end face

of the opening of the other. The projection is fitted in the recess and bonded thereto via an adhesive. At least either an inner face of the recess or a surface of the projection has a plurality of vertical ribs for defining a space between the surface of the projection and the inner face of the recess.

5908714

**METHOD OF MAKING LEAD-ACID
CELL-TO-CELL CONNECTIONS
AND THE RESULTING BATTERY**

Lund David L; Lawrence Thomas E; Kump William H Minneapolis, Inver Grove Heights, St. Paul, MN, UNITED STATES assigned to GNB Technologies, Inc

A method of making lead-acid cell-to-cell or battery-to-battery connections is disclosed which utilizes a non-conductive capture mold, made, for example, from polypropylene polymers, which capture mold has a base having holes allowing the capture mold to be placed over adjacent terminal posts of like polarity and upstanding walls having a height equal to that of the terminal posts, the capture mold serving to retain the lead alloy connector in place while the cell or battery connection is made, as by induction heating or the like.

5912091

**BATTERY HAVING SPIRALLY WOUND
ELECTRODES**

Daio Fumio; Yoshino Hiroaki; Kaneda Yoshimitsu; Tanahashi Takayuki; Shimizu Toshiyuki; Inui Takeshi Kitakatsuragi-gun, Hirakata, Moriguchi, Sakai, Yao, JAPAN assigned to Matsushita Electric Industrial Company, Ltd

In a battery comprising a spirally wound electrode group, a lead plate drawn from one electrode of the electrode group and connected to the inner bottom surface of the battery case in electrically conducting relationship, and an insulating plate interposed between the lead plate and the electrode group, at least the bottom surface of the insulating plate is formed from a heat weldable material, and the lead plate is heat-welded to this heat weldable material. This construction not only serves to completely prevent accidental short-circuiting, but enables high-speed assembling of batteries.

FUEL CELL**5902691**

**FUEL CELL WITH SHARED SPACE FOR
ELECTRODE ASSEMBLY**

Matzkin-Bridger Andrew West Bloomfield, MI, UNITED STATES assigned to UT Automotive Dearborn, Inc

The invention relates to a fuel cell stack with two separators in which adjacent, but spaced apart, electrode assem-

blies share either a fuel space or an oxidizer space between them. Each of the electrode assemblies includes a proton exchange membrane sandwiched between an anode and a cathode. A first electrode assembly is positioned apart from one of the separators and oriented with either its anode or its cathode facing that separator. Subsequent electrode assemblies are placed between the first electrode assembly and the other separator. Each subsequent electrode assembly is oriented with the opposite side, anode or cathode, as compared to the immediately preceding electrode assembly, facing the separator that is adjacent the first electrode assembly. Each space that has at least one side defined by an anode is used as a fuel space. Each space that has at least one side defined by a cathode is used as an oxidizer space. Within the stack the anodes and the cathodes of the electrode assemblies are electrically coupled to each other.

5902692
BATTERY WITH
PLANAR HIGH TEMPERATURE
FUEL CELLS

Batawi Emad Winterthur, SWITZERLAND assigned to Sulzer Hexis AG

The battery with planar high temperature fuel cells comprises a stack-shaped, alternating arrangement of electrochemically active elements and interconnectors. The interconnectors are formed as air heat exchangers, each of which has a basic body. The thermal expansion of the interconnector is largely determined by the basic body. Each basic body separates an air side from a gas side. A structured layer is arranged on both sides of the basic body in each case: namely a structured layer for electrical conduction and heat transport as well as for a transport of air or combustion gas respectively along the electrochemically active elements. The thermal expansion of the basic body corresponds substantially to that of the electrochemically active elements. Each basic body is formed as an air heat exchanger and consists of a material on whose surface a permanent oxide layer forms under the operating conditions of the battery and in the presence of oxygen. On the air side of the basic body, the structured layer is bonded to the basic body in such a manner that the basic body is protected against oxide formation at the connection points.

5904740
FUEL FOR LIQUID FEED FUEL CELLS

Davis James Lynn Parkland, FL, UNITED STATES assigned to Motorola, Inc

A sulfuric acid-free fuel composition for use in liquid feed polymer electrolyte membrane fuel cells. The fuel composition is a solution of water, methanol and formic acid. The

methanol is present in concentrations between 0.5 and 15 molar and the formic acid is present in concentrations between 0.01% and 20%. No corrosive mineral acids are present in the fuel.

5906898
FINNED INTERNAL MANIFOLD OXIDANT
COOLED FUEL
CELL STACK SYSTEM

Pondo Joseph M Bolingbrook, IL, UNITED STATES assigned to M-C Power Corporation

A fuel cell stack system comprises a plurality of fuel cell sub-stacks, each of which comprises a plurality of individual fuel cell units. A separator plate separates the fuel cell units between an anode of one fuel cell unit and a cathode of an adjacent fuel cell unit. A single separator plate separates corresponding fuel cell units in each fuel cell sub-stack. The edges of the separator plate extend substantially beyond the periphery of each fuel cell sub-stack forming oxidant flow paths between adjacent separator plates extending from the separator plate edges to the center of the separator plate from which oxidant is then distributed to each of the fuel cell units. By virtue of heat transfer from the extended edges of the separator plate to the oxidant, the heat generated by the fuel cell can be controlled.

5908713
SINTERED ELECTRODE FOR SOLID OXIDE
FUEL CELLS

Ruka Roswell J; Warner Kathryn A Pittsburgh, Bryan, TX, UNITED STATES assigned to Siemens Westinghouse Power Corporation

A solid oxide fuel cell fuel electrode is produced by a sintering process. An underlayer is applied to the electrolyte of a solid oxide fuel cell in the form of a slurry, which is then dried. An overlayer is applied to the underlayer and then dried. The dried underlayer and overlayer are then sintered to form a fuel electrode. Both the underlayer and the overlayer comprise a combination of electrode metal such as nickel, and stabilized zirconia such as yttria-stabilized zirconia, with the overlayer comprising a greater percentage of electrode metal. The use of more stabilized zirconia in the underlayer provides good adhesion to the electrolyte of the fuel cell, while the use of more electrode metal in the overlayer provides good electrical conductivity. The sintered fuel electrode is less expensive to produce compared with conventional electrodes made by electrochemical vapor deposition processes. The sintered electrodes exhibit favorable performance characteristics, including good porosity, adhesion, electrical conductivity and freedom from degradation.

5912088**GRADIENT ISOLATOR FOR FLOW FIELD OF FUEL CELL ASSEMBLY**

Ernst William D Troy, NY, UNITED STATES assigned to Plug Power, L.L.C.

Isolator(s) include isolating material and optionally gasketing material strategically positioned within a fuel cell assembly. The isolating material is disposed between a solid electrolyte and a metal flow field plate. Reactant fluid carried by flow field plate channel(s) forms a generally transverse electrochemical gradient. The isolator(s) serve to isolate electrochemically a portion of the flow field plate, for example, transversely outward from the channel(s), from the electrochemical gradient. Further, the isolator(s) serve to protect a portion of the solid electrolyte from metallic ions.

BATTERY MATERIALS**5902696****SEPARATOR FOR NONAQUEOUS ELECTROCHEMICAL CELLS**

Smesko Sally Ann; Takeuchi Esther S North Tonawanda, East Amherst, NY, UNITED STATES assigned to Wilson Greatbatch Ltd

A combination separator comprising a single layer of a non-woven, polyolefinic cloth superposed with a single layer of a polyolefinic, microporous film for use in an electrochemical cell, is described. A preferred polyolefinic material for both the non-woven cloth and the microporous film is polypropylene. The redundancy of using two layers of separator is an enhanced safety characteristic of the cell; however, the use of the polypropylene web/film combination adds another dimension to the cell's safety characteristics by imparting the benefits of each type of material.

5902698**ION CONDUCTIVE MATERIAL AND ELECTROCHEMICAL DEVICE COMPRISING THE SAME**

Nie Jin; Kita Fusaji; Murakami Koji; Kawakami Akira; Kobayashi Hiroshi; Sonoda Takaaki Kasuga, Otokuni-gun, Ibaraki, Takatsuki, Chikushino, Fukuoka, JAPAN assigned to Hitachi Maxell, Ltd

An ion conductive material containing a compound which comprises a resonance structure group which contains an atom of the Vb group in the Periodic Table serving as an anionic site and is bonded to an electron attractive organic group through an atom of the VIb group in the Periodic Table, and a counter ion selected from the group consisting of metal ions and a hydrogen ion. This material is useful as

an electrolyte of a cell since it is excellent in high voltage stability.

5902700**HYDROGEN STORAGE ALLOY ELECTRODE AND MANUFACTURING METHOD OF THE SAME**

Hirosawa Takamichi; Ikemachi Takaaki Hyogo-ken, JAPAN assigned to Sanyo Electric Company, Ltd

A hydrogen storage alloy electrode for use in electrochemical hydrogen storage cells, the electrode being in the form of a negative electrode fabricated by sintering a mixture of a hydrogen storage alloy containing manganese and an alloy containing a measured amount of manganese.

5905000**NANOSTRUCTURED ION CONDUCTING SOLID ELECTROLYTES**

Yadav Tapesh; Hu Hongxing Tucson, AZ, UNITED STATES assigned to Nanomaterials Research Corporation

Ion conducting solid electrolytes are constructed from nanoscale precursor material. Nanocrystalline powders are pressed into disc structures and sintered to the appropriate degree of densification. Metallic material is mixed with 0 to 65 vol % nanostructured electrolyte powders to form a cermet mix and then coated on each side of the disc and fitted with electrical leads. The electrical conductivity of a Ag/YSZ/Ag cell so assembled exhibited about an order of magnitude enhancement in oxygen ion conductivity. As an oxygen-sensing element in a standard O.sub.2 /Ag/YSZ/Ag/N.sub.2 set up, the nanocrystalline YSZ element exhibited commercially significant oxygen ion conductivity at low temperatures. The invention can be utilized to prepare nanostructured ion conducting solid electrolytes for a wide range of applications, including sensors, oxygen pumps, fuel cells, batteries, electrosynthesis reactors and catalytic membranes.

5905363**METHOD FOR REDUCING THE INTERNAL RESISTANCE OF RECHARGEABLE BATTERIES**

Helbing Ralf; Agulla Manuel Nordlingen, Essen, GERMANY assigned to GM Racing Modellsportvertrieb GmbH

The invention relates to a method for reducing the internal resistance (R.sub.i) of rechargeable accumulators, in particular nickel-cadmium accumulators, wherein an electric energy source is connected with the poles (.+-.) of the accumulator, which is adapted for outputting an electric energy of at least the 40-fold product of the absolute value of the short-circuit current (I.sub.K) and the absolute value of the nominal voltage of an untreated accumulator and wherein the accumulator is subjected to the energy for a predetermined time period.

5906900**NON-AQUEOUS SOLVENT SECONDARY BATTERY ELECTRODE MATERIAL AND PROCESS FOR PREPARING THE SAME**

Hayashi Manabu; Yamaguchi Shoji; Mizutani Fumikazu; Nishioka Keiko; Mori Shoichiro Ami-machi, JAPAN assigned to Mitsubishi Chemical Corporation

Disclosed are an electrode material for a non-aqueous solvent secondary battery, which comprises a composite carbonaceous material in which to the surface of a graphite carbonaceous material is attached a carbonized material of an organic substance in an amount to give a carbon residue of 12 parts by weight or less and 0.1 part by weight or more based on 100 parts by weight of the graphite carbonaceous material, and a process for preparing an electrode material for a non-aqueous solvent secondary battery, which comprises the steps of introducing a slurry obtained by adding an aromatic organic solvent to a mixture of graphite carbonaceous material particles and an organic substance and adjusting viscosity to 10000 cp or lower into a mixing and stirring apparatus having a reaction room which has a paddle rotatable by a shaft in an inner portion thereof, the inner wall surface of the reaction room being formed substantially along the outermost line of rotation of the paddle and also, being provided a mechanism of deaerating a solvent, heating it to a temperature of the boiling point of the solvent or higher and lower than 600°C while stirring to prepare a solid intermediate and heating said intermediate to 600°C or higher under inert gas atmosphere to effect carbonization. According to the non-aqueous solvent secondary battery electrode material of the present invention, there can be provided a non-aqueous solvent secondary battery in which good electric characteristics that while maintaining discharging capacity which is as high as graphite, irreversible capacity can be suppressed to extremely low and charging efficiency is excellent can be obtained and further stability to an electrolyte is improved. Also, according to the preparation process of the present invention, a composite carbonaceous material having such high characteristics and uniform characteristics can be prepared stably with good efficiency.

5908717**ELECTROLYTE COMPOSITION FOR RECHARGEABLE ELECTROCHEMICAL CELLS**

Pendalwar Shekhar L; Oliver Manuel; Venugopal Ganesh Lawrenceville, Duluth, Duluth, GA, UNITED STATES assigned to Motorola, Inc

An electrochemical cell includes first and second electrodes with an electrolyte system disposed therebetween. The electrolyte system includes a polymeric support structure through which is dispersed an electrolyte active species in an organic solvent. The solvent, which remains liquid to low temperatures, is a binary or higher order system comprising diethyl carbonate and one or more of propy-

lene carbonate, ethylene carbonate, dimethyl carbonate, dipropylcarbonate, dimethylsulfoxide, acetonitrile, dimethoxyethane, tetrahydrofuran, n-methyl-2-pyrrolidone, and combinations thereof.

5910366**THIN FILM COMPOSITE MEMBRANE AS BATTERY SEPARATOR**

Chowdhury Geeta; Adams William; Conway Brian; Sourirajan Srinivasa Ottawa, Nepean, Ottawa, 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.

5910378**MEMBRANE ELECTRODE ASSEMBLIES**

Debe Mark K; Larson James M; Balsimo William V; Steinbach Andrew J; Ziegler Raymond J Stillwater, Saint Paul, Afton, Saint Paul, Glenwood City, WI, UNITED STATES assigned to Minnesota Mining and Manufacturing Company

Membrane electrode assemblies are described that include an ion conductive membrane a catalyst adjacent to the major surfaces of the ion conductive membrane and a porous particle filled polymer membrane adjacent to the ion conductive membrane. The catalyst can be disposed on the major surfaces of the ion conductive membrane. Preferably, the catalyst is disposed in nanostructures. The polymer film serving as the electrode backing layer preferably is processed by heating the particle loaded porous film to a temperature within about 20 degrees of the melting point of the polymer to decrease the Gurley value and the electrical resistivity. The MEAs can be produced in a continuous roll process. The MEAs can be used to produce fuel cells, electrolyzers and electrochemical reactors.

5910383**PRODUCTION PROCESS OF CARBONACEOUS MATERIAL AND BATTERY**

Hase Yoshihiko; Morotomi Hidetoshi; Okamoto Hiromi; Komura Syoji; Takigawa Yasuyuki; Hirano Shigeyuki; Shiode Tetsuo Tokyo, JAPAN assigned to Adchemco Corporation

A process is provided for the production of a carbonaceous material. The process comprises the following steps: subjecting a vacuum distillation residual pitch to heat treatment until the content of quinoline-insoluble components thereof becomes 50 to 85 wt. %, whereby the pitch is converted into a mesophase pitch; grinding the thus-obtained mesophase pitch into fine particles having an aspect ratio not greater than 2; subjecting the thus-ground product to oxidation treatment; and subjecting the thus-oxidized product to carbonization or graphitization treatment. A

lithium ion secondary battery comprises a negative pole made of the carbonaceous material.

5912093
POLYURETHANE-BASED POLYMERIC
ELECTROLYTE AND PROCESS FOR
PRODUCING SAME

Wen Ten-Chin; Cheng Tsung-Tien Tainan, Kaohsiung, TAIWAN assigned to National Science Council

The present invention is related to a process for producing a polyurethane-based polymeric electrolyte including steps of: a) providing a polyurethane material as a matrix material; b) dispersing the matrix material in a first solvent to form a dispersion solution; c) drying the dispersion solution to form a thin film of polyurethane as a matrix of the polymeric electrolyte; and d) adding a component of an organic electrolyte into the matrix to form the polyurethane-based polymeric electrolyte. The present invention is also related to a polyurethane-based polymeric electrolyte including a thin film of a polyurethane serving as a matrix of the polymeric electrolyte; and an organic electrolyte arranged in the matrix for ionic conduction. The fabricated thin film electrolyte has satisfactory conductivity and can be suitably used in cells.

LITHIUM BATTERIES

5907899
METHOD OF FORMING ELECTRODES FOR
LITHIUM ION BATTERIES USING
POLYCARBOSILANES

Dahn Jeffery Raymond; Wilson Alf M; Xing Weibing; Zank Gregg Alan Surrey, Vancouver, Burnaby, Midland, MI, CANADA assigned to Dow Corning Corporation

A lithium ion battery electrode formed by the pyrolysis of a polycarbosilane followed by introducing lithium ions. These electrodes can be used to form batteries with large capacities, low irreversible capacity, high density and good safety behavior.

5908715
COMPOSITE CARBON MATERIALS FOR
LITHIUM ION BATTERIES,
AND METHOD OF PRODUCING SAME

Liu Qingguo; Qiu Weihua; Yang Leiling; Lu Shigang Beijing, PEOPLE'S REPUBLIC OF CHINA assigned to Hughes Electronics Corporation

A composite particulate material for use in anodes of lithium-ion batteries. The particles of the material include a graphite core that has been provided with a surface layer including a non-graphitizable carbonaceous material. The graphite core having an interplanar spacing of at least about 0.346 nm. The method of producing the composite is also disclosed.

5908716
LITHIUM-CONTAINING SULFATES, METHOD OF
PREPARATION AND USES THEREOF

Barker Jeremy Henderson, NV, UNITED STATES assigned to Valence Technology, Inc

The invention provides a battery having an electrode active material comprising a mixed-metal sulfate compound. The mixed-metal consists of at least one alkali metal and at least one transition metal. Preferably, the sulfate compound is a polysulfate having more than one SO₄ group. The invention also provides novel lithium-metal-sulfate compounds and electrodes comprising such novel compounds.

5910382
CATHODE MATERIALS FOR SECONDARY
(RECHARGEABLE) LITHIUM BATTERIES

Goodenough John B; Padhi Akshaya K; Nanjundaswamy KS; Masquelier Christian Austin LaSalle, Joplin, Boulogne Billancourt, MO, FRANCE assigned to Board of Regents, University of Texas Systems

The invention relates to materials for use as electrodes in an alkali-ion secondary (rechargeable) battery, particularly a lithium-ion battery. The invention provides transition-metal compounds having the ordered-olivine or the rhombohedral NASICON structure and the polyanion (PO₄)₃⁻ as at least one constituent for use as electrode material for alkali-ion rechargeable batteries.

5911920
MANUFACTURING METHOD FOR LI
COMPOSITE OXIDES EMPLOYED AS
ELECTRODE MATERIALS IN LI BATTERIES

Hasezaki Kazuhiro; Motomura Hikaru; Kamada Masatomo Nagasaki, JAPAN assigned to Mitsubishi Heavy Industries, Ltd

It is an object of the present invention to provide a manufacturing method for Li composite oxides employed as electrode materials for Li ion batteries which is capable of obtaining Li composite oxides having a stable composition using heat treatment at comparatively low temperatures. An Li source compound and an M source compound (where M is one or more elements selected from a group containing Mn, Ni, Co, Fe, V, Ti, Sc, Y, and Al) having an element M in a composite with Li are mixed at predetermined proportions. A chemical reaction is caused by pulverizing and mixing this raw material mixture in an inert gas atmosphere. The pulverization, mixing, and reaction are continued until the raw material can no longer be detected. After pulverization and mixing, the raw material mixture is subjected to heat treatment by heating it to a temperature within a predetermined range.

5911947

FAN-FOLDED POLYMER-ELECTROLYTE CELL
Mitchell Nathan The Woodlands, TX, UNITED STATES
assigned to Compaq Computer Corporation

A method for fan-folding lithium-ion-polymer battery cells, wherein gaps are left in the active material at fold locations of the metallic backing conductor. This avoids fatigue at the fold locations when the active materials expand and contract during charge and discharge.

NICKEL METAL HYDRIDE BATTERIES**5910379**

**HYDROGEN ABSORBING ALLOY FOR A
NEGATIVE ELECTRODE OF AN
ALKALINE STORAGE BATTERY**

Kasashima Masaki; Hamaya Noriaki; Shinya Naofumi; Shima Satoshi Fukui-ken, JAPAN assigned to Shin-Etsu Chemical Company, Ltd

Provided is a hydrogen absorbing alloy suitable for a negative electrode of an Ni-hydrogen storage battery effective at low temperature, more specifically, a R-Ni type of hydrogen absorbing alloy represented by a general formula $RNi_{.sub.a}Co_{.sub.b}Al_{.sub.c}M_{.sub.d}$, and with Mo content of 50 to 500 ppm wherein R expresses not less than 18 wt % Pr and one or more metals other than Pr, Ni, Co, Al and M, and M expresses one or more metals selected from the group consisting of Fe, Cr, Cu, and Mn, and a to d expresses positive numbers in the specified range. Moreover, the above alloy further containing trace amounts of Mg, Ti, Pb, oxygen, carbon, and/or sulfur is provided.

5912090

NICKEL-HYDROGEN STACKED BATTERY PACK
Nagai Ryo; Fukunaga Hiroshi; Takai Masahiko Hirakata, Settsu, Kobe, JAPAN assigned to Hitachi Maxell, Ltd

A nickel-hydrogen stacked battery pack containing at least two element cells each having a positive electrode, a negative electrode, a separator inserted between the positive and negative electrodes and an electrolytic solution, in which the element cells are stacked and contained in a hexahedral case, and an opening of said case is sealed with a sealing plate having a reversible vent, which battery pack has a high capacity.

COMPONENT AND / OR CHARGERS**5903136**

**METHOD FOR CHARGING SECONDARY
BATTERIES**

Takahashi Tadashi; Funaki Satoru; Miyazaki Hideki; Nishimura Katsunori; Kumashiro Yoshiaki; Takanuma Akihiro Hitachi, Yokohama, Hitachi, Hitacioota, Hitachi, Shimotsuga-gun, JAPAN assigned to Hitachi, Ltd

During the charging of a secondary battery, the charging current is maintained, but the value of the current is changed for a short time, and the internal resistance of the battery is calculated from the voltage and the current before and after the changing of the charging current. The charging voltage is determined by adding an extra voltage equivalent to the voltage drop caused by the internal resistance to a designated voltage. Thus, it takes only a short time for stabilizing the voltage when the current is changed, because the charging current is not switched off completely. Therefore, the charging time can be shortened.

OTHER BATTERIES**5904998**

**METAL-AIR CATHODE CAN AND
ELECTROCHEMICAL CELL MADE THEREWITH**
Dopp Robert B; Oltman John Edward Madison, Mount Horeb, 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 less.

5904999

AIR-COOLED METAL-AIR BATTERY

Kimberg Sergey; Gilon Yoel; Shrim Yaron; Schneider Vladimir Jerusalem, Jerusalem, ISRAEL assigned to Electric Fuel (E.F.L.) LTD

The invention provides An electrochemical zinc-air multi-cell battery, each cell being of the type provided with a housing having, two outer major surfaces, and two spaced-apart inner walls, the inner walls defining a first inner chamber for containing therein a zinc electrode, and in conjunction with the outer major surfaces defining two outer chambers for receiving reaction air; two generally planar, gas-permeable, but liquid-impermeable air electrodes, each of the electrodes being installed in a window-like opening provided in each of the inner walls, an electrolyte in contact with the zinc electrode and the air electrodes, means for directing a flow of the reaction air into a first inlet provided in a first outer side surface of the housing through both of the outer chambers substantially

in a uniform flow distribution across the outer faces of both of the air electrodes, and out of a second outlet provided in an opposite outer side surface of the housing, and cooling air flow directing means for causing cooling air to flow between two adjacently positioned cells, along the outer faces of the major surfaces of two interfacing adjacent cells, the surfaces respectively being arranged to be in contact with and to cool the reaction air in each of the outer chambers bounded by the respective surfaces.

5905004

ELECTRODE FOR ALKALI SECONDARY BATTERY AND METHOD FOR PRODUCING THE SAME

Sakai Tetsuo; Uehara Itsuki; Yoshinaga Hiroshi; Wada Masasi Ikeda, Kyoto, JAPAN assigned to Director General, Agency of Industrial Science & Technology, Fukuda Metal Foil & Powder Company, Ltd

The primary object of the present invention is to provide an electrode for an alkali secondary battery, the electrode being capable of exhibiting high binding power and showing a high electrical conductivity without use of a binder. An electrode for an alkali secondary battery, the electrode comprising a molded product molded from a mixture containing an active material-containing powder and a flaky nickel powder which has lowered strain.

5906661

BATTERY CONSTRUCTIONS AND METHOD FOR FORMING SUCH BATTERY CONSTRUCTIONS

Lake Rickie C Eagle, ID, UNITED STATES assigned to Micron Communications, Inc

In one aspect, a method of making a battery includes fusing an alkali metal onto a patterned conductive layer. In another aspect, a method of forming a battery includes: a) providing a cathode base which comprises: a first noncon-

ductive surface; a first conductive layer superjacent the first nonconductive surface; the first conductive layer comprising a first area; and a cathode layer superjacent the first conductive layer leaving at least a portion of the first area exposed; b) providing an anode base which comprises: a second nonconductive surface; a second conductive layer superjacent the first nonconductive surface, the second conductive layer comprising a second area; and an anode layer superjacent the second conductive layer leaving at least a portion of the second area exposed, the anode layer comprising an alkali metal; and c) aligning and coupling the anode layer of the anode base with the cathode layer of the cathode base, wherein the aligning and coupling leaves at least a portion of the first area and at least a portion of the second area exposed for electrical connection. The invention also encompasses batteries formed by such methods.

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ALKALINE STORAGE BATTERY

Kitano Shinichiro; Matsui Hideki; Arisawa Kenji; Ozaki Kazuaki; Terasaka Masayuki; Shimozono Kazuki; Nakatani Kensuke Sumoto, Hyogo-ken, JAPAN assigned to Sanyo Electric Company, Ltd

An alkaline storage battery including a bottomed cell casing assembled as either one of positive and negative terminals, a closure cap assembly coupled with an opening of the cell casing in a liquid-tight manner as the other terminal to hermetically seal the interior of the cell casing and a generator element composed of positive and negative electrodes assembled within the cell casing, wherein a current collecting plate extended from either one of the positive and negative electrodes is welded at least at two spaced portions thereof with a bottom surface of the closure cap assembly to enhance mechanical strength and the vibration resistance property of the storage battery and to reduce internal resistance of the storage battery.