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METHOD OF UTILIZING OZONE TO GENERATE ELECTRICAL ENERGY

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References Cited

U.S. PATENT DOCUMENT

Number	Name	Date
US5,932,367	Collien et al.	Aug. 3, 1999

Other References

Photo Actinia Oxygen Therapy Electric Reaction by T.H. Moray (1959)
Direct Conversion of Energy (1964), by William R. Corliss pp. 28-29

ABSTRACT

A method is disclosed for generating electrical energy with ozone gas. The invention may be used either as a primary type cell or as a fuel type cell. Said invention can combine low-amperage ionizing energy with low-voltage, high-amperage, electrochemical energy, producing a composite higher power output.

6 Claims, 1 Drawing Figure

METHOD OF UTILIZING OZONE TO GENERATE ELECTRICAL ENERGY

FIELD OF INVENTION

This invention in general is related to electrochemical conversion cells having high densities.

BACKGROUND OF THE INVENTION

Typical electrochemical metal to air, and fuel cells are limited because not enough oxygen can be absorbed by the cathode. Another drawback is that expensive catalysts are used to speed absorption in many instances.

The present invention overcomes the aforementioned limitations by converting oxygen to ozone gas. This creates available monatomic oxygen that can be readily converted to electrical energy and more particularly, to the utilization of ionized monatomic oxygen to economically generate high power densities. The present invention provides a method that offers improved performance over prior art electrochemical power generating cells.

The method herein will utilize any energy source that oxygen will absorb to effect its transformation into ozone. High-voltage ionization from electronic sources, ultraviolet light, ionization caused by radioactive materials, etc, may be used to cause this transformation. Any number of energy sources that can convert oxygen into ozone can be used and will not depart from the spirit of this invention.

Devices that convert ionizing energy to electrical current have been used in prior art, with poor results.

Atomic batteries generate electric currents by utilizing the ionizing particles emitted from radioactive substances. William R. Corliss discusses the direct use of ionized particles expelled by radioisotopes in his report; Direct Conversion of Energy (1964) pp. 28-29. In his report high-velocity ionized beta particles emitted by strontium-90 creates a current of ionized particles. The charge on the particles becomes neutralized by a metallic cylinder. The

neutralized particles will find their way back to the strontium-90 becoming again ionized. This cycle repeats itself so long as the strontium-90 remains radioactive. The power generated by this method generates high-voltages but produces extremely low amperages.

Despite the prior art that exists in this technology, it is believed that there has not previously existed a small, compact electrical device capable of generating high levels of power. It is the object of this invention to provide a method embodying an improved device to furnish an efficient and economical source of electrical power. The present invention resolves limitations of prior art electrochemical cells.

The primary object of the present invention is to provide a direct method utilizing ozone gas to generate electrical energy, and a new and novel device for utilizing various ionizing sources with high efficiencies.

SUMMARY OF THE INVENTION

In accordance with the present invention there is provided a method of utilizing an ionizing energy source to generate ozone gas from an existing supply of oxygen.

In the present invention, new and novel improvements are apparent. Limitations of prior art have been resolved by the method disclosed herein. The need for expensive catalysts such as platinum is eliminated. The present invention utilizes the basic principles of electrochemical cells known in the art. However, the present invention is unique in that it utilizes generated ozone gas from its external oxygen supply. When ozone is generated by the present invention it gives up free electrons. The ozone also donates monatomic oxygen to the cathode. As oxygen (O_1) enters the cell, it is absorbed by the cathode electrode.

The oxygen atoms (O_1) react with the water molecules in an electrolyte that is typically KOH + H_2O, resulting in negatively charged hydroxyl (OH^-) ions. In this reaction the cathode loses electrons and becomes positively charged.

The hydroxyl ions migrate through the electrolyte and react with the opposite anode electrode oxidizing it. The anode receives electrons through the reaction, and when an electrical load is connected between the electrodes, electrons will flow to the cathode from the negatively charged anode. I do not stake my claim to the electrochemical process involved. I stake my claim to the method used to deliver monatomic oxygen to the cell. Converted ozone generated from a number of energy sources, and oxygen in the present invention may be directly available for driving motors, lighting, production of heat, and used in electrochemistry.

The method of the invention includes the means for utilizing an ionizing source of energy adjacent to the cathode of an electrochemical cell surrounded by air, or alternately from another source of oxygen, such as hydrogen peroxide. Means are provided to convert ozone gas to electrical energy. It is also advantageous to provide an ionizing energy source at the anode when the present invention is used as a fuel cell.

Other objectives and advantages of the present invention will become apparent from the following description of the preferred embodiment of the present invention, with references to the attached drawings, in which:

FIG. 1 illustrates the method used in the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In accordance with the present invention, there is provided an electrochemical cell comprising an anode electrode, an air cathode, and an electrolyte that serves as an ion-conducting medium. It is preferred that the chosen electrolyte is one that does not react with the electrodes used in the present invention. A metal screen is provided to supply ozone to the cathode electrode. This screen can by ionized by any number of available sources known in the art. A second metal screen can additionally be

provided to ionize hydrogen fuels at the anode. When using the present invention as a primary cell then this second screen is not required.

The method to generate electrical energy includes a device described that generates ozone to be supplied to an electrochemical cell. This can be accomplished by exposing the provided metal screen to a high-voltage electronic source. This source must be high enough to ionize air. A high frequency, high voltage, low amperage, electronically generated energy source can be used for this purpose. Ionizing radioactive materials may also be plated onto the provided metal screen. Various ionizing sources may be used and will not depart from the spirit of this invention.

The conversion of ozone to useful electrical energy is made apparent in the present invention. The effect of this invention provides a practical and economic energy source instantly. Oxygen is converted to electrical energy with extreme efficiency with the utility of the present invention.

Referring now to **FIG. 1** of the drawings, an anode electrode **1** is provided. A porous separator **3** is moistened with an ion conducting electrolyte, such as potassium hydroxide (KOH + H_2O). A porous air cathode electrode **2** is provided. **5a** and **5d** are metal screen. The metal screen **5a** and metal screen **5d** may be coated with an ionizing radioactive source. Any number or combinations of radioactive materials may be used and still will not depart from the spirit of this invention. Metal screen **5b** and metal screen **5c** serve as physical electrical contacts. Fiberglass cloth **4a** and fiberglass cloth **4b** are provided to serve as gas traps where ionization is to occur. Other cloth-like insulating material may be used and will not depart from the spirit of this invention. I stake my claim to the method of power generation, not to its general embodiment.

If an ionizing energy is applied to metal screen **5a** or metal screen **5c** from an electronic source then it must be primed by an external ionizing source, not shown. Metal screen **5a** and metal screen **5c** may consist of a metal composite, or metal ceramic and still will not depart from the

spirit of the present invention. When said invention begins generating electrical energy, the external ionizing source is no longer required. Wire lead **6a** is physically connected to anode **1** and provides a positive charge to be connected to an external electrical circuit (not shown). Wire lead **6b** is physically connected to cathode **2** and provides a negative charge to the external electrical circuit, not shown. Wire lead **6c** is physically connected to metal screen **5a** where the ionizing energy is provided when the present invention is to operate as a fuel cell. Wire lead **6d** is physically connected to metal screen **5d** where ionizing energy is provided when the present invention is to be operated as a primary, or fuel cell.

With the present invention, greater amounts of energy can be obtained in a more compact manner than with any previously known electrochemical system.

Any number of electronic circuits can be used to generate the required ionizing energy and will not depart from the spirit of this invention.

Having thus described the invention, what is claimed is:

1. An electrochemical ozone cell producing electric current comprising:
   (a) a porous electronegative anode;
   (b) a porous electropositive cathode;
   (c) a separator of said porous electropositive anode and said porous electronegative oxygen cathode;
   (d) and an electrolyte that is chemically inert in respect to said anode and said cathode that permits the migration of ions between said anode and said cathode.

2. An ionizing metal screen or screens energized by:
   (a) radioactive matter;
   (b) ultraviolet light;
   (c) x-rays;
   (d) cosmic-rays;
   (e) chemical;
   (d) electronic excitation; or
   (e) atmospheric potential.

3. A cloth-type-insulating separator for separating said metal screen or screens from said anode and said cathode of claim 2.
4. Metallic screens, composed of metal, an alloy, metal composite, or metal ceramic that physically contact said anode and said cathode of claim 1.
5. Metallic wire leads that are physically connected to said anode and said cathode of claim 1.
6. Metallic wire leads that are physically connected to said metal screens of claim 4.

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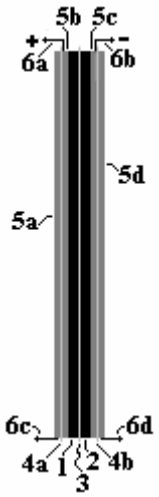

Fig. 1