SYSTEM AND METHOD FOR REMOTE MONITORING UTILIZING A RECHARGEABLE BATTERY

FIELD OF THE INVENTION

The present invention generally relates to a system and a method for remotely monitoring, and, more specifically, to a system and a method for remotely monitoring a person using a portable unit that is powered by a self-recharging battery.

BACKGROUND INFORMATION

Medical devices that monitor a biological parameter of a patient are often implanted with a battery. Typically, the battery is replaced before the energy supply is substantially drained. A conventional battery implanted in the patient does not generally reveal the amount of remaining energy supply at a given time. Thus, a conventional battery is replaced periodically. This results in a waste of batteries as well as possibly subjecting the patient to invasive surgery which carries with it enhanced costs, labor and risk.

Some medical devices are powered by rechargeable batteries; however, such batteries still require the patient to make hospital visits in which an external power supply device is coupled to the rechargeable battery. This may require an uncomfortable procedure in which the patient is hooked up to electrodes or subjected to high intensity electromagnetic radiation.

What is needed to help avoid these disadvantages is a portable monitoring unit that is powered by a self-recharging battery.

SUMMARY OF THE INVENTION

The present invention provides for a system for remotely monitoring a person, which includes a portable unit with a self-recharging battery, the portable unit being adapted to monitor a biological parameter and a physical position or location of the person; a global positioning satellite transmitting global positioning system (GPS) data to the portable unit; and a central unit disposed remotely from the portable unit, the central unit being in communication with the portable unit via a ground station.

The present invention further provides for a method for remotely monitoring a person including the steps of adapting a portable unit to be powered by a self-recharging battery; self-recharging the self-recharging battery; receiving, from a global positioning system (GPS) satellite to the portable unit, information relating to a physical location; monitoring, at the portable unit, a biological parameter of the person; and wirelessly communicating the information relating to the physical location and the biological parameter of the person from the portable unit to a central unit via a ground station.

The present invention also provides for a self-recharging battery including a photocell disposed proximately to and under a skin surface of a person; a recharging cell coupled to the photocell; and a battery cell coupled to the recharging cell. The photocell is adapted to receive ambient light and is adapted to generate a potential difference across the recharging cell in response to receiving the ambient light. The recharging cell is adapted to store charge in response to the potential difference. The battery cell is adapted to recharge using the stored charge.

The present invention also provides for a self-recharging battery including a transducer disposed in a region of a person with a substantial temperature gradient; a recharging cell coupled to the transducer; and a battery cell coupled to the recharging cell. The transducer is adapted to generate a potential difference across the recharging cell in response to heat flow through the transducer. The recharging cell is adapted to store charge in response to the potential difference. The battery cell is adapted to recharge using the stored charge.

The present invention also provides for a self-recharging battery including a transducer coupled to a pulsing blood vessel; a rectifier coupled to the transducer; a recharging cell coupled to the rectifier; and a battery cell coupled to the recharging cell. The transducer is adapted to generate an alternating electrical signal in response to the pulsing blood vessel. The rectifier is adapted to rectify the alternating electrical signal. The recharging cell is adapted to store charge in response to the rectified electrical signal. The battery cell is adapted to recharge using the stored charge.

The present invention also provides for a self-recharging battery including a transducer coupled to a human voice box of a person; a rectifier coupled to the transducer; a recharging cell coupled to the rectifier; and a battery cell coupled to the recharging cell. The transducer is adapted to generate an alternating electrical signal in response to acoustic waves generated by the human voice box. The rectifier is adapted to rectify the alternating electrical signal. The recharging cell is adapted to store charge in response to the rectified electrical signal. The battery cell is adapted to recharge using the stored charge.

The present invention also provides for a self-recharging battery including a transducer disposed proximately to and under a skin surface of a person; a rectifier coupled to the transducer; a recharging cell coupled to the rectifier; and a battery cell coupled to the recharging cell. The transducer is adapted to generate an alternating electrical signal in response to acoustic waves generated by an ambient environment. The rectifier is adapted to rectify the alternating electrical signal. The recharging cell is adapted to store charge in response to the rectified electrical signal. The battery cell is adapted to recharge using the stored charge.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates an embodiment of a system and a method for remotely monitoring of a person according to the present invention.

FIG. **2** illustrates an embodiment of a portable unit according to the present invention.

FIG. **3** illustrates an embodiment of a self-recharging battery according to the present invention.

FIG. **4** illustrates another embodiment of the self-recharging battery according to the present invention.

FIG. **5** illustrates two possible locations for a transducer of the self-recharging battery according to the present invention.

FIG. **6** illustrates another possible location for the transducer of the self-recharging battery according to the present invention.

FIG. **7** illustrates still another embodiment of the self-recharging battery according to the present invention.

FIG. **8** illustrates a possible location for a transducer of the self-recharging battery according to the present invention.

DETAILED DESCRIPTION

Although the present invention is generally applicable to systems and methods for remote monitoring, the following