



Evercell™ Power Cells

Overview

Evercell™ power cells from Evergreen Technologies, LLC (one of The Face® Companies) offer a semiconductor-based thermal energy harvester as a battery alternative for providing power that is substantially permanently sustainable for a broad array of low power sensors, embedded circuits and wireless communications devices. The patented and patents-pending Evercell™ incorporates a breakthrough technology – a passive structure – to harvest thermal energy from any environment in which the temperature is above absolute zero. Evercell™ has no need for other external stimuli, including motion, pressure, RF energy or electromagnetic energy.

How It Works

The basic design of the Evercell™ power cell energy harvesting (EH) element encompasses four very thin layers, in the tens to hundreds of nanometers range. Opposing electrodes sandwich a dielectric that is less than 200nm thick. The surface of the donor electrode is surface treated, including using semiconductor principles, to lower the work function of its surface thereby imposing a low work function surface in intimate contact with the donor electrode and facing the dielectric.

The surface of the donor electrode is treated to reduce the work function of the surface to be typically in a range of 1.0eV or less. The receptor electrode is formed of a material to have a work function typically in a range of 2.0eV or greater. Electron migration occurs as electrons constantly in motion are able to more easily escape the donor electrode surface and accumulate on the receptor electrode surface. The proximity of the donor and receptor electrodes, preferably in a range as small as between 20 and 60nm, promotes a quantum tunneling effect with regard to the migration and accumulation of the electrons in a measurable manner.

When a load is connected between the electrodes, a manageable discharge occurs through the load.

EH elements are stacked within the Evercell™ power cell device to scale down the packaged area, and/or to scale up the power.

Details regarding the science are available on request.

Patent Protected

The Evercell™ technology is protected by a number of patents that describe and varyingly claim the basic structure of the power cell, methods for making the power cell and incorporation of the power cell as a permanent internal power source for a number of electronics and sensor applications. Face International Corporation, the parent of Evergreen Technologies LLC, has pursued, and continues to pursue, a robust intellectual property scheme that has resulted in the issue of U.S. Patents Nos. 9,786,718, on October 10, 2017; 9,793,317, on October 17, 2017; and 9,893,261, on February 13, 2018. An additional twelve U.S. and International patent applications directed to the technology have been filed.

Contact

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