

Actuated Electrochemical Power Source

Researchers at the University of South Florida have developed a new method that makes use of a novel actuation mechanism for initiation of the galvanic reaction within a power cell to produce electric current.

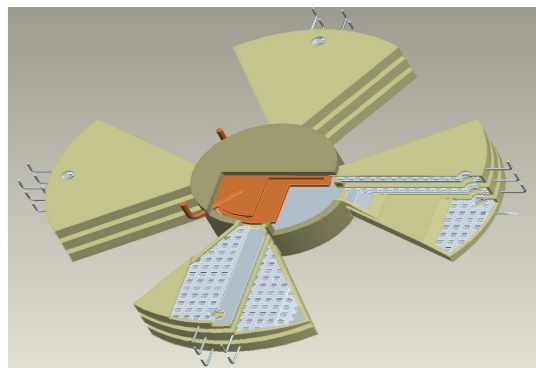
Innovations in the miniaturation of both everyday use electronic devices and specialized micro-eletromechanical devices has led to the need for an efficient power supply in a smaller scale. In addition, on-demand power supplies in various environments which benefit from delayed activation have become an area of attention with the increased exploration of space, underwater and remote locations.

This invention provides a system for initiation of the chemical reactions within a fuel cell or battery system which is heat pressure driven. It provides an initiation system for an electrochemical cell which is responsive to heating that provides a regulated stream of electrolyte to the reaction chamber. In addition to this, the invention also provides an electric current producing system that is regulated by the input of electrolyte into the reaction chamber that does not require pumping mechanisms or similar hardware systems.

By use of a temperature liquid increment which expands, a micro fluidic stroke is generated which in turn leads to a thermo-electric-pneumatic action. The micro-fluidic system can activate the power generation on demand conferring the battery a very long shelf life. The system is comprised of a reservoir section and a reaction chamber. A conduit provides fluid communication between the reservoir and the reaction chamber which may be any distance apart from each other. Contained with the reservoir are the actuation liquid and the electrolyte. The reaction chamber contains electrodes and, when in operation, electrolyte. The actuation fluid is heated which in turn drives electrolyte into the conduit and subsequently into reaction chamber. This technology is applicable to any field where a power supply is required.

ADVANTAGES:

- High energy density
- Provides a system for initiation of the chemical reactions within a fuel cell or battery system which is heat pressure driven
- Longer shelf life - on-demand power generation
- Environmentally-friendly



*Schematic of a Conceptual Group of Cells
Actuated at the Same Time to Satisfy
Specific Power Demands*

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