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Micro-Machined Aluminum Galvanic Cells for MEMS Devices

Researchers at the University of South Florida have developed a high energy micro-aluminum galvanic power cell and an associated high volume fabrication process.

Microelectromechanical systems (MEMS) are devices with micro-scale components that have been developed into highly interesting technologies, such as micro-sensors and micro-actuators. With the proliferation of MEMS technologies, power generation for these micro devices is becoming an important topic. Aluminum-anode galvanic cells are highly desirable as energy sources for MEMS, and fabrication methods for these cells are known. However, these methods utilize unsophisticated manufacturing techniques that are difficult to duplicate in a mass fabrication environment. As such, there is a need for a highly reproducible process for fabricating high-energy micro-aluminum galvanic cells.

To address this problem, USF inventors have developed a high volume process for manufacturing thin aluminum anode batteries. These batteries are capable of delivering a substantial amount of energy for their size (per unit weight) when compared to larger batteries within specific time intervals. They are capable of achieving a considerable current density, and they can achieve large voltages when high currents are available. The batteries exhibit a longer on-the-shelf life due to their on-demand powering capability, which mitigates the time-degradation of performance that is common in commercially available batteries. Additionally, the materials used in the galvanic cell manufacturing process are environmentally inert and pose minimal risk as contaminants. This micro battery is an ideal candidate for powering remote, deployable, or in-the-field sensors and other MEMS devices.

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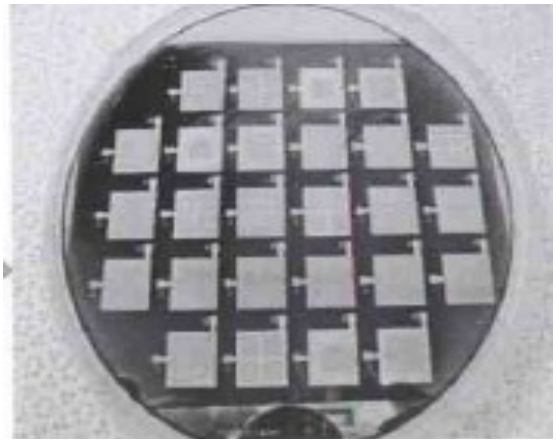
ADVANTAGES:

- **Substantial power density and performance**
- **High volume manufacturing method and long shelf-life**
- **Environmentally inert materials used in fabrication process**

Highly Manufacturable Micro-Sized Galvanic Cells to Deliver On-Demand Power



Fabricated Micro-Batteries on a Wafer

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