TECHNOLOGY

Nano Arrays For Energy Storage

OVERVIEW

Background
Fabricating next generation nano-structured devices using densely packed interfaces and thin films is highly desirable in markets searching for high density energy storage, particularly with high power capability. Current high density storage systems are relatively high in per unit, installation, and maintenance costs, and are not optimized for applications needing high power either for time-varying load demand or energy supply. One approach involves building multilayer structures of large area inside an open volume of a nanostructured template.

Innovative Technology
Researchers at the University of Maryland have generated a method of fabricating arrays of metal-insulator-metal nanocapacitors with a much higher capacitance per unit planar area than existing porous template systems. Devices fabricated with this approach become highly viable energy storage systems possessing high energy density and high power density. As a result, these electrostatic nanocapacitors have importance for high burst power applications requiring the energy density of supercapacitors while maintaining the exceptional power capability of electrostatic capacitors.

Applications
• High burst, high density storage applications
• Vehicle and electronic device batteries
• Portable power
• Backup power devices (e.g., uninterruptible power systems)

Advantages
• Bottom-up nanoassembly
• Ten times higher capacitance per unit pore volume
• All atomic layer deposition (ALD) processing with anodic aluminum oxide (AAO) formation sequence has a reduced cost and significant performance advantage due to these self-aligned nanocapacitors

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Additional Information

INSTITUTION

University of Maryland, College Park

PATENT STATUS

Patent(s) pending

LICENSE STATUS

Contact OTC for licensing information

CATEGORIES

- Microelectronics
- Nanotechnology + Nanoparticles + Nanomaterials
- Power Electronics
- Materials

EXTERNAL RESOURCES

- US Patent 8,912,522
- US Patent 10,032,569

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