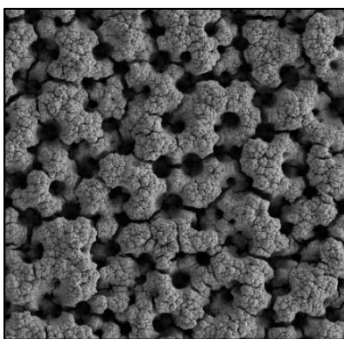


Microsupercapacitors & Microbatteries based on 3D architecture

Microsupercapacitors & Microbatteries are extensively utilized as high energy density storage options devices for on-chip microelectronic systems. Such micro domain applications require high surface area within limited volume to maximize energy storage in compact space. 3D structures coated with active materials are thus extensively sought after for such applications. However, current coating techniques either fail to have conformal coating of 3D microstructures or require elaborate infrastructure (like ALD, CVD, etc.) under harsh conditions (high vacuum and temperature > 200° C) with long preparation times. The proposed technology aims to overcome these issues with ambient condition formation of 3D microstructures and conformal coating of supercapacitive active & battery materials through a facile optimized electrodeposition process.

DESCRIPTION*

- Process for fabrication of active materials coated porous current collector:
 - Electrodeposition of porous metallic current collectors
 - Applicable on wide variety of conductive substrates
 - Supercapacitors
 - Conformal coating of supercapacitive RuO₂
 - Microbatteries
 - Conformal deposition of Li+ active anodes and cathodes
 - Microbattery electrodes with high durability and rate performance



Porous Electrode



Photos : ©LAAS-CNRS & blackboard AbodeStock

TECHNICAL SPECIFICATIONS

| | |
|--------------------|-----------------------------|
| Current collectors | Au, Au/Cu, Pt/Cu etc. |
| Substrates | Any conductive substrate |
| Scale | 400 um – 4 inch wafer level |

COMPETITIVE ADVANTAGES

- Room temperature deposition
- Facile process – no pre/post treatment
- Aqueous electrolyte bath
- Tunable porosity, thickness, pore distribution, etc.

APPLICATIONS

- Microenergy storage with high power/energy requirements
- For Li/Na air battery electrodes
- Electrodes for fuel cells
- Li ion microbatteries

INTELLECTUAL PROPERTY

- Patent pending

DEVELOPMENT STAGE

- Experimental proof of concept



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