Nanostructured Ink Material For Electronic And Energy Storage Devices And Methods Of Making And Using Thereof

Tech ID: 32648 / UC Case 2013-407-0

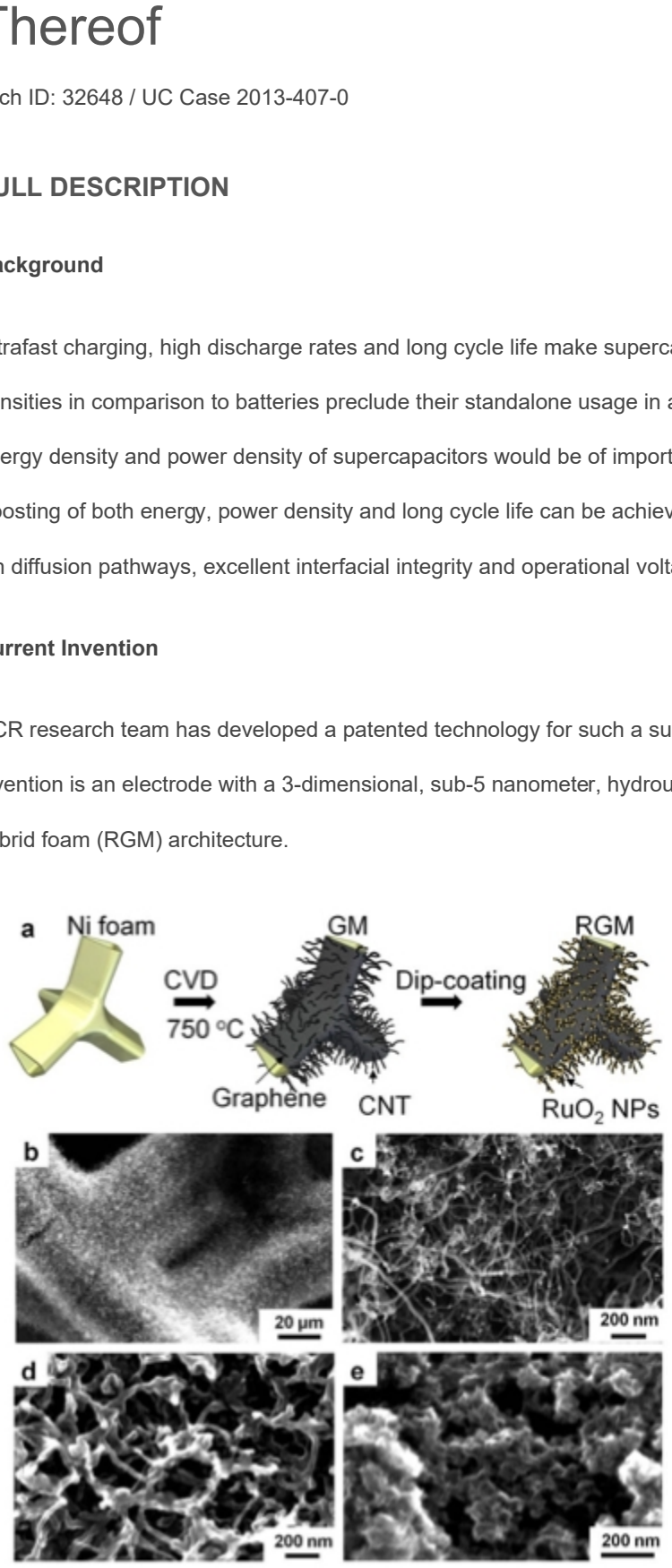
FULL DESCRIPTION

Background

Ultrafast charging, high discharge rates and long cycle life make supercapacitors a valuable energy storage device. Their lower energy densities in comparison to batteries preclude their standalone usage in applications that require prolonged energy discharge. Boosting the energy density and power density of supercapacitors would be of importance for their adoption in applications such as Electric Vehicles. Boosting of both energy, power density and long cycle life can be achieved by parameters such as high capacitance, large surface area, short ion diffusion pathways, excellent interfacial integrity and operational voltage window.

Current Invention

UCR research team has developed a patented technology for such a supercapacitor with higher energy and power density. Their simple invention is an electrode with a 3-dimensional, sub-5 nanometer, hydrous Ruthenium Oxide (RuO2) anchored graphene and carbon nanotube hybrid foam (RGM) architecture.



Schematic illustration of the preparation process of RGM foam and SEM images showing the as grown foam and different loading of RGM.

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OTHER INFORMATION

KEYWORDS

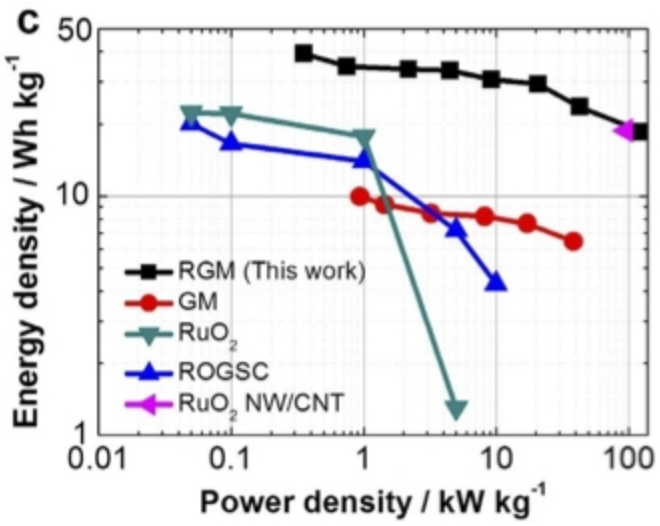
Supercapacitor, Energy storage, Electrochemistry, Nanotechnology, Carbon materials, Ruthenium Oxide, Energy density, Power density

CATEGORIZED AS

- **Energy**
  - Other
  - Storage/Battery
- **Materials & Chemicals**
  - Nanomaterials
- **Nanotechnology**
  - Materials

RELATED CASES

2013-407-0, 2013-406-0



Ragone plot related to energy density and power density of packaged whole cell RGM supercapacitor.

ADVANTAGES

The significance of their discovery is defined by:

- Superior gravimetric and per area specific capacitance - 502 Farads/gram.
- Higher energy density of 39.28 WH/kg and higher power density of 128.01 KW/kg.
- Easy and scalable method for fabrication.
- Electrochemical stability over many charge-discharge cycles.

SUGGESTED USES

- Supercapacitors.
- Energy storage devices.

RELATED MATERIALS

- Hydrous Ruthenium Oxide Nanoparticles Anchored to Graphene and Carbon Nanotube Hybrid Foam for Supercapacitors

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,580,591	03/03/2020	2013-407
United States Of America	Issued Patent	10,163,583	12/25/2018	2013-406

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