Facile Synthesis of Hierarchically Porous Carbon Tubes Inherently Doped with Nitrogen, Oxygen and Iron oxide Nanoparticles as Supercapacitor Electrodes

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Introduction

The device exhibited a maximum energy density of 67.8 W h kg⁻¹ with a maximum power density of 15000 W Kg⁻¹.

Experimental

Preparation of Hierarchical Porous Carbon Tubes (HPC)

Surface area analysis

SEM analysis

TEM analysis

XRD & Raman analysis

The maximum BET surface area is 1879 m² g⁻¹ and pore volume is 0.91 cm³ g⁻¹.

Results and Discussion

Micro tube like structure with interconnected networks

TEM-EDS analysis confirms the presence of N, O and Fe in the carbon molecular skeleton.

Electrochemical Characterization

Mechanism for EDLC

Two electrode system

1M Na₂SO₄ in aqueous solution

Three electrode system

1M LiTFSI in organic solvent

Chemical states of the elements

Heteroatoms doped a high surface area carbon is prepared from ramacham by ZnCl₂ activation method

Heteroatom doped high performance supercapacitors are fabricated, specific capacitance 61 F g⁻¹ with a maximum power density of 15000 W Kg⁻¹.

References


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