Fabrication of ternary composite $ZnFe_2O_4/Co_3O_4/G$ for high performance supercapacitor

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Nagsen Meshram

Institute of Chemical Technology Marathwada Campus, Jalna, Maharashtra, 431203, India

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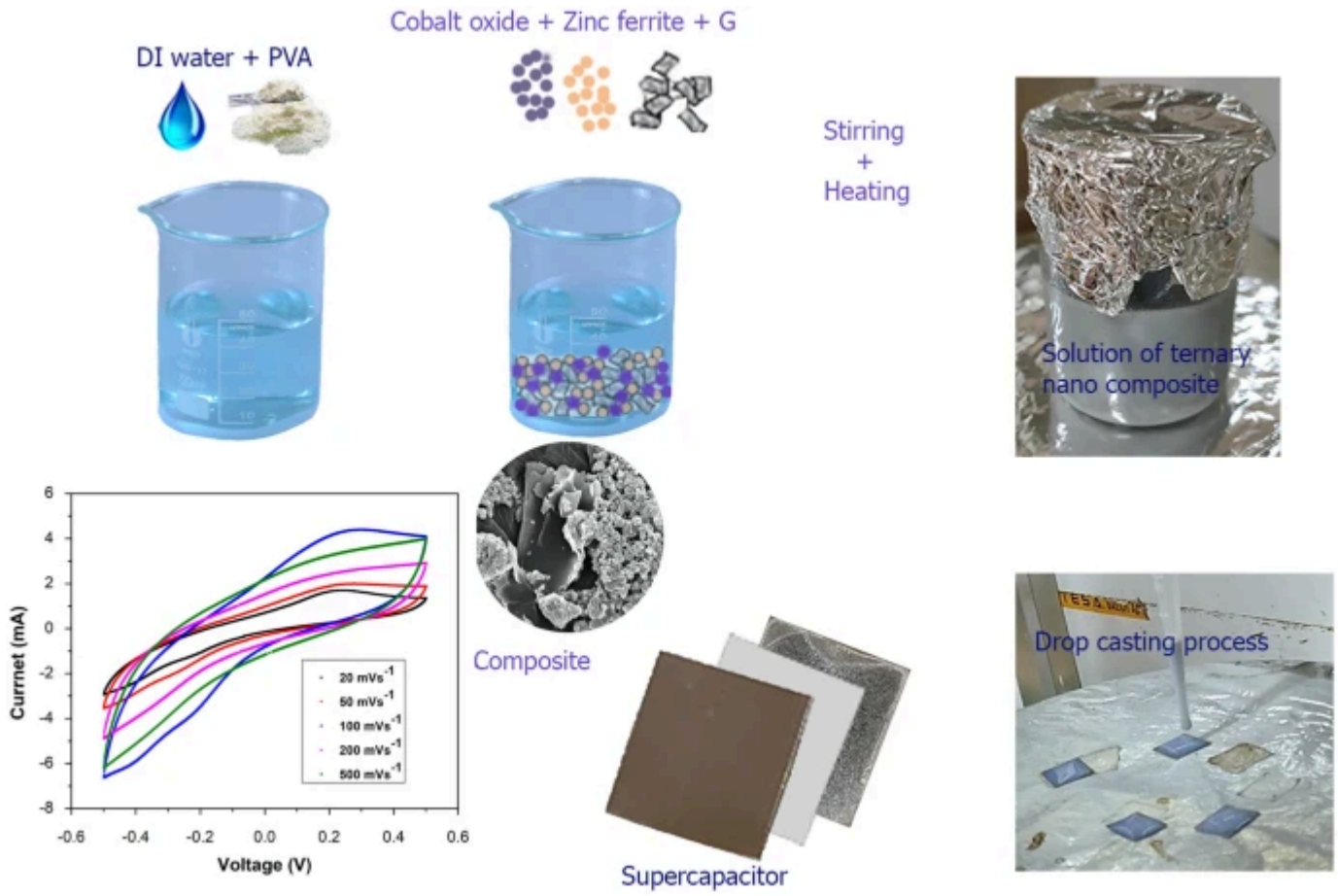
Rajan Lakra, Rajiv Kumar, Nagsen Meshram, Mamraj Singh, Deepika Choudhary, Neha Jain, Dhirendranath Thatoi & Ankur Soam

Abstract

The present work includes fabrication of a ternary composite of $ZnFe_2O_4$, Co_3O_4 and graphene ($ZnFe_2O_4/Co_3O_4/G$) for high performance supercapacitor. $ZnFe_2O_4$, Co_3O_4 and graphene are combined in a single electrode in order to have large value of specific capacitance with excellent cycle stability. The electrochemical properties were evaluated using cyclic voltammetry, constant current charging/discharging and electrochemical impedance spectroscopy. The supercapacitor with two electrodes of $ZnFe_2O_4/Co_3O_4/G$ exhibited a specific capacitance of 580 Fg^{-1} at scan rate 20 mVs^{-1}, which is larger than $ZnFe_2O_4/G$ and Co_3O_4/G based binary composites. XRD results confirm the formation of ternary composite. SEM and TEM analysis have been performed for morphology

investigation. $ZnFe_2O_4$ and Co_3O_4 nanoparticles were observed to be attached well on the graphene nanosheet. The synthesized electrode performed favourable and satisfactory performance in supercapacitor.

Graphical Abstract



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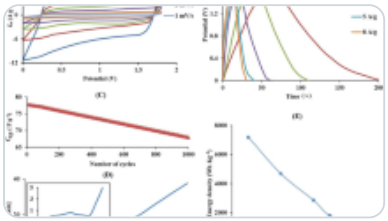

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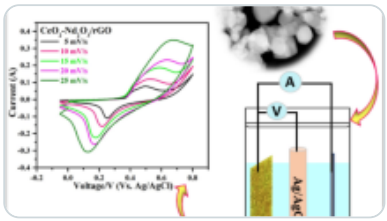

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Data availability

The datasets generated during the current study are available from the corresponding author on reasonable request.

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Author information

Authors and Affiliations

Department of Mechanical Engineering, Siksha 'O' Anusandhan, Deemed to be University, Bhubaneswar, India
Rajan Lakra, Dhirendranath Thatoi & Ankur Soam

Department of Physics, University of Rajasthan, Jaipur, 302004, India
Rajiv Kumar, Mamraj Singh, Deepika Choudhary & Neha Jain

Institute of Chemical Technology Marathwada Campus, Jalna, Maharashtra, 431203, India
Nagsen Meshram

Corresponding author

Correspondence to Ankur Soam.

Ethics declarations

Conflict of interests

The authors have no conflicts of interest to declare. All authors have seen and agree with the contents of the manuscript and there is no financial interest to report.

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Supplementary Information

Below is the link to the electronic supplementary material.

Supplementary file1 (DOCX 3641 KB)

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