



65th DAE
SOLID STATE
PHYSICS SYMPOSIUM

Dec 15 - 19, 2021



PROGRAMME & ABSTRACTS

Venue
DAE Convention Centre
Anushaktinagar, Mumbai

Organized by
Bhabha Atomic Research Centre
Mumbai



Sponsored by
Board of Research in Nuclear Sciences
Department of Atomic Energy
Government of India

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Cr₂O₃ is considered to be a promising cathodic material for supercapacitor applications on the account of its fast redox kinetics, mesoporous structure, and better electrochemical stability. Herein, we introduced a one-step synthesis of Cr₂O₃ which depicts a unique cactus-like morphology. Such structure improves the specific surface area and ion diffusion mechanism, which enhances the capacitance value. The prepared Cr₂O₃ displayed a specific capacitance value of 35 F g⁻¹ at 5 mV s⁻¹, with capacitive retention of ~ 60 % at a scan rate as high as 150 mV s⁻¹. This can be attributed to the redox couple of Cr⁴⁺/Cr³⁺ displayed by Cr₂O₃ at the electrode-electrolyte interface. Hence, cathodic electrodes based on such novel morphology of Cr₂O₃ can be used for devising high-performance supercapacitors, with appreciable chemical stability, and rate performance

10080

High Performance Na-ion Supercapacitor: Beyond Carbon Structures

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Recent trends in sodium-ion-based energy storage devices have shown a potential use of hollow structures as an electrode material to improve the performance of storage systems. Carbon based material are also the leading material with sodium-based electrode materials. In this paper, V₂O₅ nanorods have been employed as the efficient electrode material for Na-ion batteries. These nanostructures showed impressive electrochemical activity in 2 M NaOH electrolyte owing to their redox activity.

10081

Role of Minority-spin States and Cu Doping on CO Interaction over Pt₃Cu Nanocluster

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First-principles based on dispersion corrected spin-polarized density functional theory (DFT-D3) calculations were performed to investigate the structural properties, relative energetics, and electronic reactivity descriptors (ERDs) of neutral and charged Pt₄, Cu₄, and Pt₃Cu NCs. The interaction mechanism of CO over energetically preferable NCs was examined and our results of ERDs indicate that the doping of Cu atom reduces the strength of CO on Pt atom which can eliminate the poisoning effect of CO.

10082

Evaluation of Xanthan gum with additive salts as an electrolyte for Sodium-ion Batteries

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The skyrocketing demand of Lithium ion batteries (LIBs) leads to the urge to develop potential energy storage devices. Sodium-ion batteries (SIBs) could be a good alternative due