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Simonkolleite-graphene foam composites and their superior electrochemical performance

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**Abstract content (Max 300 words)
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Simonkolleite-graphene foam (SimonK/GF) composite has been synthesized by a facile solvothermal and environmentally friendly technique with excellent electrochemical properties. The obtained product was initially analyzed by scanning electron microscopy (SEM), Brunauer–Emmett–Teller (BET), X-ray diffraction (XRD), Fourier Transform Infrared Resonance (FTIR) Spectroscopy and Cyclic Voltammetry (CV) techniques. The microscopy results reveal hexagonal sheets interlaced with each other and adjacent graphene sheets. The existence of graphene foam in the simonK/GF composite is further confirmed from the structural and the optical characteristics obtained from XRD and FTIR respectively. The BET results obtained indicate an improvement in the surface area due to the addition of graphene foam to a value of 39.58 m² g⁻¹. The N₂ adsorption/desorption also shows the presence of active mesopores required for charge transport. As a promising electrode material for supercapacitors, the composite shows a high specific capacitance value of 1094 F/g at 1 A/g with a coulombic efficiency of 99.7% even after 1000 charge-discharge cycles. These results show a potential for adoption of this composite in energy storage applications.

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