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Comparing the Electrochemical Performance of Bare SnS and Cr-Doped SnS Nanoparticles Synthesized through Solvothermal Method

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In the present study, SnS and Cr-doped SnS nanoparticles were synthesized by solvothermal method. The structural, functional, elemental, morphological, and electrochemical properties of the as-synthesized non-doped and Cr-doped SnS nanoparticles were examined using XRD, Raman, FTIR, SEM/EDX, and cyclic voltammetry analysis. The XRD results indicated a good crystallinity of the sample and confirmed the formation of the SnS nanoparticles in orthorhombic structure. The FTIR result also confirmed the functional groups present in the Cr-doped SnS nanoparticles. The well-formed SnS nanoparticles are observed as spherical shapes confirmed from the SEM analysis. EDX spectra confirmed the presence of Sn, Cr, and S elements in the Cr-doped SnS nanoparticles. The electrochemical performance of Cr-doped SnS nanoparticles shows higher specific capacitance of 375 F/g compared with 284 F/g of bare SnS nanoparticles, which confirms that Cr-doped SnS nanoparticles are promising candidate for supercapacitor applications.

Keywords: hydrothermal method, XRD, FTIR, SEM/EDX, TEM, electrochemical performance.