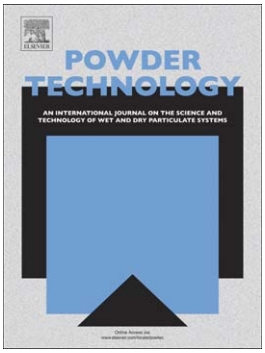

A simple synthesis method of nanocrystals CeO_2 modified rGO composites as electrode materials for supercapacitors with long time cycling stability

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A simple synthesis method of nanocrystals CeO_2 modified rGO composites as electrode materials for supercapacitors with long time cycling stability

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Abstract: CeO_2/rGO nanocomposites have been successfully synthesized by a simple oil bath process. The morphology and structure of the CeO_2/rGO composites was characterized by field emission scanning electron microscopy (FE-SEM), transmission electron microscopy (TEM), X-ray diffraction (XRD), Raman spectra and Particle Size Analyzer. It is found that numerous of CeO_2 nanocrystals are well dispersed over the surface of thin graphene nanosheets. The electrochemical properties of the CeO_2/rGO composites were studied using cyclic voltammetry (CV), galvanostatic charge-discharge (GCD) and electrochemical impedance spectra (EIS) measurements by a three-electrode system. The CeO_2/rGO composites electrode exhibited high specific capacitance (282 F g^{-1} at 2 A g^{-1}) and excellent electrochemical performance based on the cycling stability (retaining 243 F g^{-1} after 1000 cycles). The binary composites possess higher electrochemical capacitance than each individual component as supercapacitor electrode materials. Such intriguing electrochemical performance is mainly attributed to the synergistic effects of CeO_2 and graphene. The CeO_2/rGO nanocomposites show excellent electrochemical properties for energy storage applications, which evidence their potential application as supercapacitors.

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