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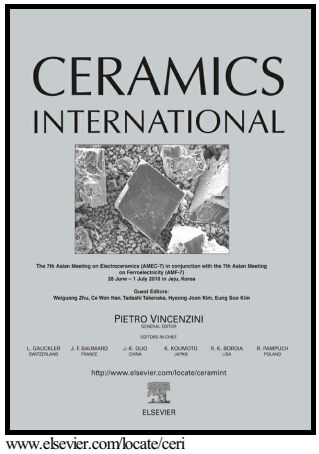

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Cobalt oxide nanocubes as electrode material for the performance evaluation of electrochemical supercapacitor

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Abstract

Porous cobalt oxide (Co_3O_4) nanocubes (NCs) were synthesized by a simple and cost-effective hydrothermal technique for the potential application of electrochemical supercapacitors. The hydrothermally synthesized materials exhibited the small cube like morphology with the average size of ~50-60 nm. The surface analysis revealed a good surface area, and high pore volume of the synthesized porous Co_3O_4 NCs. The capacitive properties of porous Co_3O_4 NCs electrode were investigated by cyclic voltammetry (CV) in 6 M KOH electrolyte and a high specific capacitance of ~430.6 F/g at a scan rate of ~10 mVs^{-1} was observed. The capacity retention of up to ~85% following 1000 cycles was shown by the fabricated porous Co_3O_4 NCs electrode. The porous Co_3O_4 NCs showed excellent structural stability through cycling with promising capacity retention which suggested a good quality of porous Co_3O_4 NCs as electrochemical supercapacitor electrode.

Keywords: Co_3O_4, Nanocubes, Electrode, Supercapacitors, Specific capacitance.

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