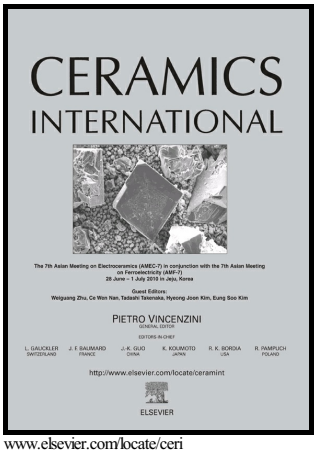

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Triethylenediamine-assisted one-step hydrothermal synthesis of polyhedron-shaped Co_3S_4 for high performance supercapacitor

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Abstract: We describe a facile one-step hydrothermal route to devise and synthesize polyhedron-shaped Co_3S_4 nanomaterial assisted by triethylenediamine (TEDA) as ligand and structure-directing agent. The structural characterizations indicate that the obtained products are Co_3S_4 polyhedral nanoparticles with irregular size, which interconnect and stack each other to construct an interlinked microstructure. When investigated for its supercapacitance property, the as-fabricated Co_3S_4 electrode material exhibits typical pseudocapacitance performances with a high specific capacitance of 1038 $F \cdot g^{-1}$ at a current density of 0.5 $A \cdot g^{-1}$ and excellent cycling stability of only 10.2% decay in its original specific capacitance after 1000 galvanostatic charge-discharge cycles, suggesting its potential application in supercapacitor. Importantly, this facile TEDA-assisted hydrothermal method can be universal to obtain other transition metal chalcogenides for supercapacitors.

Keywords: Co_3S_4; Triethylenediamine; Polyhedron-shaped; Pseudocapacitance; Supercapacitor.