

Highly Efficient Manganese Tetroxide nanoparticles based Electrode for electrochemical supercapacitors

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This work reports on the synthesis of Mn₃O₄ nanoparticles (NPs) by a low temperature solution process at 80°C using potassium permanganate, urea and cetyltrimethylammonium bromide (CTAB). The crystalline, structural and structural properties of synthesized Mn₃O₄ NPs deduced the characteristic tetragonal spinel structure of Mn₃O₄, where the divalent manganese ions were attached in the tetrahedral coordination. From UV-Vis NIR observations, the optical band gap (E_g) of Mn₃O₄ NPs is 2.37 eV. For electrochemical supercapacitor applications, the synthesized Mn₃O₄ NPs were mixed with activated carbon to prepare electro-active electrode. Cyclovoltametry (CV) measurements revealed that Mn₃O₄ NPs based electro-active electrode exhibited the good electrochemical and capacitive properties.