

High electrochemical performance of hierarchical mesoporous MnCo_2O_4 as an electrode material for supercapacitors and electrocatalyst

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Hierarchical mesoporous MnCo_2O_4 microspheres have been synthesized using a simple and cost-effective co-precipitation approach followed by a post-annealing treatment. The synthesized spinel MnCo_2O_4 exhibit flower like morphology having a three-dimensional interconnected network. The electrodes made from the MnCo_2O_4 nanoarchitecture exhibit excellent multi-functional electrochemical performance. It deliver an excellent specific capacitance of 1857 F g^{-1} at a 5mV scan rate with 97% capacitance retention even after 5000 cycles. When applied to electro-catalytic oxidation with 0.5 M methanol it maintained the current density up to 75 A g^{-1} . The superior electrochemical performances are mainly due to three-dimensional interconnected porous architecture area offering faster ion/electron transfer, an improved reactivity, and an enhanced structural stability. For the synthesis of orientationally tailored hierarchical structures we believe that this work may provide the simple but yet promising basis, which may open new avenues. This work was supported by the National Research Foundation of Korea (NRF) funded by the Ministry of Education (Grant number: NRF-2013R1A1A2060638).