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Microwave synthesis of a novel transition metal doped MOFs derived Ni@Mn Yolk-shell for high energy density supercapacitor electrodes

A series of layer-structured materials based on Transition Metals (TMs) doped MOFs derived Ni@Mn Yolk-shell were synthesized and successfully used as supercapacitor electrode materials for the first time. The as-synthesized materials exhibited exceptional electrochemical properties owing to the combined properties of its constituents, high surface area and good electrical conductivity of the Yolk-shell MOFs and TMs, respectively. Several analytical characterization techniques were employed to investigate the morphology, crystal structure atomic arrangement and elemental chemical state in the materials for which scanning electron microscopy (SEM), X-ray diffraction (XRD) and X-ray photoelectron spectroscopy (XPS) were conducted, respectively. Moreover, the electrochemical properties of the as-synthesized materials were examined by performing cyclic voltammetry (CV), galvanostatic charge-discharge (GCD) and electrochemical impedance spectroscopy (EIS) measurements. Furthermore, the effect of doping concentration on the interlayer distance of the as-synthesized layer-structured materials and the charge transfer resistance were investigated and correlated to the exceptional electrochemical properties. Such good performing electrode materials are highly promising for the next generation of energy storage devices.

Apply to be considered for a student ; award (Yes / No)?

No

Level for award;(Hons, MSc, PhD, N/A)?

N/A

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