Up-scalable synthesis of highly crystalline electroactive Ni-Co LDH nanosheets for supercapacitor applications

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The development of cost-effective and scalable synthetic methods is of paramount importance to achieve industrial application of energy conversion and storage devices based on layered double hydroxides (LDH). Herein, we synthesized NiCo-LDH nanosheets via a simple up-scalable co-precipitation method at relatively low temperature. Moreover, we used several characterization techniques to unveil the unique properties of the novel NiCo-LDH among which XRD, EDS, XPS and FT-IR. Consequently, we further investigated NiCo-LDH nanosheets using cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS) to evaluate the electroactivity of the as-synthesized NiCo-LDH for energy storage. Overall, the electrochemical test of the as-synthesized NiCo-LDH revealed remarkable performance exhibiting a specific capacitance as high as 2,140 Fg⁻¹ (5 mV/s).

Keywords: NiCo-LDH nanosheets, co-precipitation, EIS, cyclic voltammetry, supercapacitor

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