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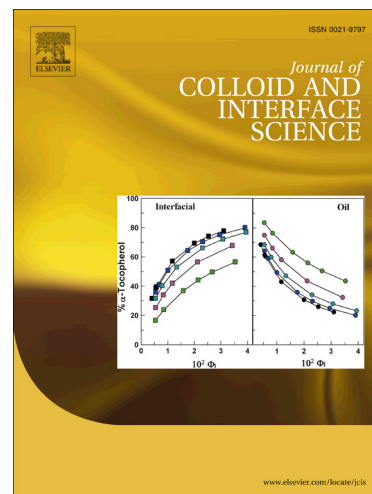
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# Hydrothermal synthesis and Electrochemical performances of 1.7 V NiMoO<sub>4</sub>.xH<sub>2</sub>O||FeMoO<sub>4</sub> aqueous hybrid supercapacitor

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## Abstract

One-dimensional (1D) NiMoO<sub>4</sub>.xH<sub>2</sub>O nanorods and βFeMoO<sub>4</sub> microrods are successfully synthesized by simple hydrothermal method without using any organic solvents. X-ray diffraction (XRD) patterns reveal the single phase formation of nickel molybdate (NiMoO<sub>4</sub>.xH<sub>2</sub>O) and pure monoclinic phase of βFeMoO<sub>4</sub>. The growth of one dimensional morphology of both the molybdate is identified from scanning and transmission electron microscopic (SEM & TEM) images. The cyclic voltammogram envisage the pseudocapacitance behaviour of NiMoO<sub>4</sub>.xH<sub>2</sub>O and βFeMoO<sub>4</sub> through the reversible redox reactions of Ni<sup>3+</sup>/Ni<sup>2+</sup> and Fe<sup>3+</sup>/Fe<sup>2+</sup> ions. An asymmetric supercapacitor is fabricated using NiMoO<sub>4</sub>.xH<sub>2</sub>O nanorods and βFeMoO<sub>4</sub> as a positive and negative electrode, respectively. The βFeMoO<sub>4</sub>||NiMoO<sub>4</sub>.xH<sub>2</sub>O asymmetric supercapacitor delivers a capacitance of 81 F g<sup>-1</sup> at a current density of 1 mA cm<sup>-2</sup>. The cell exhibits a high energy density of 29 W h kg<sup>-1</sup> and good cycling stability even after 1000 cycles.

**Keywords:** Nickel molybdate, Iron molybdate, Asymmetric capacitor, Pseudocapacitance, Energy Density

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