Ultrasonic Synthesis of α -MoO₃ Nanobelt@CNTs Composite for Lithium Battery and its Electrochemical Performances

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α -MoO₃ nanobelt@CNTs composite is synthesized from α -MoO₃ nanobelt and multi-walled carbon nanotubes (CNTs) via ultrasonic mixing process. XRD and SEM measurement prove the layer structure and nano-belt morphology of the product. Although α -MoO₃ nanobelt@CNTs composite delivers less initial discharge capacity than pure α -MoO₃ nanobelt, cycling performance is improved due to the introduction of CNTs into composite. Microscopic mechanism of Li⁺ transportation through α -MoO₃ nanobelt@CNTs composite electrode is revealed by cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS). Nyquist plots of α -MoO₃ nanobelts@CNTs composite electrode vs. polarization potentials in the first discharge process shows that during Li⁺ intercalates into α -MoO₃ nanobelts@CNTs composite electrode, SEI-film resistance (R_{SEI}), electronic transmission resistance (R_e), and charge transfer resistance (R_{ct}) play an important role in different periods (2.9-2.0 V, 2.0-1.5 V and 1.4-1.2 V), respectively.

Keywords: α -MoO₃ nanobelt@CNTs composite; ultrasonic synthesis; microscopic mechanism; Nyquist plots.

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