

Electrochemical Properties of Metal Oxide Synthesized by Continuous Supercritical Hydrothermal Process

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Metal oxide nanoparticles were prepared using simple continuous supercritical hydrothermal synthesis. Supercritical hydrothermal synthesis of metal oxide (MO, where M is Mn, or Cu) nanoparticles from metal nitrate aqueous solution was carried out at 400 oC and pressures 300 bar. Size and morphology of the obtained particles were characterized by SEM and XRD, respectively. The electrochemical properties of the as-synthesized metal oxide nanoparticles were investigated to determine their suitability as anode materials for lithium-ion batteries. The lithium/MO cell was charge-discharged at 0.1 C and showed a first discharge capacity of 791 mAhg⁻¹ for CuO and 1109 mAhg⁻¹ for MnO₂. The discharge capacity of the Li/MO cell drastically decreased with cycle number. For the CuO electrode, the discharge capacity was around 130 mAhg⁻¹ after 30 cycles. The supercritical hydrothermal synthesis method might be a useful method to prepare metal oxide nanoparticles for the anode material of lithium batteries.