

Synthesis and Electrochemical Properties of Ordered Mesoporous Mixed Mn-Ni System as Anode for Lithium Ion Battery

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Manganese oxide is one of the most promising anode materials for LIB since it is naturally abundant, low cost, eco-friendly, and high theoretical capacity (1000 mAh/g). However, manganese oxide shows low initial Coulombic efficiency originated by poor decomposition of Li_2O at the first charge. Nickel oxide introduction within transition metal oxide frameworks is the breakthrough to overcome the present problem due to the high catalytic activity of Li_2O decomposition of nickel oxide. Also, the initial coulombic efficiency of transition metal oxide would be enhanced. In this study, nickel oxide was introduced into the mesoporous manganese oxide frameworks by the nano-casting method using mesoporous silica template (KIT-6). Therefore, ordered mesoporous mixed Mn-Ni system was successfully prepared and analyzed. Synthesized material has a specific BET surface area of $140 \text{ m}^2/\text{g}$ and pore diameters of 3 nm and 10–20 nm. As-prepared product was evaluated as the anode material for lithium ion battery. It exhibits high reversible capacity (1437 mAh/g), and higher initial Coulombic efficiency (71%) than mesoporous manganese oxide at the first cycle.