Improved initial coulombic efficiency of various metal coated ordered mesoporous Mn_xO_y anode materials for lithium ion battery

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Rechargeable lithium-ion batteries have been generally accepted as the most promising electrochemical storage devices for potential applications in cellular telephones, laptop computers, and digital cameras.

Mesoporous anode material that consisted of particles containing nano-size pores separated by walls of similar size can deliver high rate power and high stability on cycling.

Among them, mesoporous manganese oxides can be used as anode materials characteristic of high electrochemical capacity, good capacity retention and high rate performance. Unfortunately, due to the complicated oxidation states of Mn, the diversity of manganese oxides and interference from factors such as surface chemistry and morphology of the material, the lithium-storage mechanisms of the manganese oxides are still in argument. In addition, the low initial coulombic efficiencies (below 60%) of the manganese oxides in the first cycle were usually attributed to the formation of a solid electrolyte interface (SEI) layer and the pulverization of the active materials