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Investigation into the origin of high stability of δ -MnO₂ pseudo-capacitive electrode using operando Raman spectroscopy

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Abstract

Manganese oxides of different structures, especially α -MnO₂, have been extensively studied as electrodes for pseudocapacitors. However, the poor stability associated with intercalation of proton has been the main obstacle to their commercial applications. To effectively mitigate this problem, it is necessary to fully understand the energy storage mechanism of the MnO₂ phases. In this study, δ phase MnO₂ has been synthesized through controllable electroplating on architectural Ga-doped ZnO (GZO) bones, demonstrating a high specific capacitance of 1,068 F g⁻¹ and high stability (slight performance drop focus on the first 2,000 cycles and then remained

¹ These authors contributed equally to this work.

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