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Controlled synthesis of hierarchical birnessite-type MnO₂ nanoflowers for supercapacitor applications

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Abstract: Birnessite-type MnO₂ nanoflowers assembled by hierarchical nanosheets were successfully synthesized via a facile and simple hydrothermal process. The ratio of reactants is a critical factor affecting the formation process of MnO₂ nanoflowers. The electrochemical test of the as-synthesized birnessite-type MnO₂ exhibits excellent electrochemical property with ideal voltammetry behavior, high specific capacitance (197.3 F.g⁻¹ at 1 A.g⁻¹) and superior cycling stability (only 5.4% capacitance loss after 1000 cycling test). The distinct hierarchical nanostructure and impressive electrochemical performances suggest the birnessite-type MnO₂ is a promising material for supercapacitor applications.

Keywords:

Hydrothermal; supercapacitor; birnessite-type MnO₂; nanoflower; specific capacitance

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