Study on Charge Storage Mechanism of NiCo₂O₄ Nanoarray Grown on Ni Foam

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NiCo₂O₄ is one of the most intensively studied electrode materials of pseudocapacitor. In this work, the charge storage mechanism of NiCo₂O₄ nanoarray and the impact of morphology structure are studied. The relationship between peak current of cyclic voltammetric and sweep rate is investigated and the results show both capacitive and diffusion-controlled processes are occurred. The capacitive charges and diffusion-controlled charges are calculated separately and the capacitive charge storage only contributes 28.4%~66.3% of the total stored charges at 5 mV s⁻¹ for different morphology samples. Even at 100 mV s⁻¹, a general number of stored charges are controlled by diffusion process. The influence of structure and morphology on charge storage process are also explored which demonstrate the overlapped and complex structures would increase the diffusion resistance and enlarge the diffusion time during fast energy storage processes. These results indicate

Keywords: NiCo₂O₄; capacitive charge; diffusion-controlled charge; charge storage mechanism

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