

عنوان مقاله:

Pseudocapacitive performance of cobaltite and nickel cobaltite electrodes fabricated by layer-by-layer chemical deposition method

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خلاصه مقاله:

The development of efficient strategies for fabricating binder-free electrodes to electrochemical energy storage applications is of interest. Here, a novel approach of layer-by-layer chemical deposition was proposed for the preparation of binderless cobaltite ( $\text{Co}_3\text{O}_4$ ) and nickel cobaltite ( $\text{NiCo}_2\text{O}_4$ ) pseudocapacitive electrodes. The structure and morphology of the electrodes were obtained by X-ray diffraction (XRD) and field emission scanning electron microscopy (FESEM) examinations. The results demonstrated that the active materials were uniformly deposited on the surface of the nickel current collector. Also, a more porous structure was obtained in the case of nickel cobaltite electrode, which could improve the diffusion of ions to the active materials. Pseudocapacitive performance of the electrodes was obtained by cyclic voltammetry (CV), galvanostatic charge-discharge (GCD) and electrochemical impedance spectroscopy (EIS) measurements. The results demonstrated that the nickel cobaltite electrode exhibited superior charge storage performance including a high specific capacitance of  $1251 \text{ F g}^{-1}$  at  $1 \text{ A g}^{-1}$  and good rate capability ( $89.7\%$  capacitance retention with a  $10$ -fold increase in the current rate), which were higher than those for the cobaltite electrode.

کلمات کلیدی:

Nickel cobaltite, Chemical deposition, Binder-free electrode, Supercapacitors

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