Facile Synthesis of Ni-Co Double Hydroxide on Carbonized Cotton Cloth for High Performance Supercapacitor

Yanni Shen¹, Xueli Miao¹, Dandan Song¹, Yanting Li¹, Yuning Qu¹, Jianguo Yu¹, Jiajun Tang², Hao Qin¹, Lili wang^{1,*}, Jiahao Ren¹, Bing Wang^{1,*}

¹ School of Environment and Chemical Engineering, State Key Laboratory of Separation Membranes and Membrane Processes, Tianjin Polytechnic University, 399 Binshui West Road, Tianjin 300387, P. R. China

² School of Materials Science and Engineering and Tianjin Key Laboratory of Fiber, Tianjin Polytechnic University, Tianjin 300387, China

*E-mail: wanglili@tjpu.edu.cn, cnbingwang@tjpu.edu.cn

doi: 10.20964/2019.03.30

Received: 20 November 2018/ Accepted: 12 January 2019 / Published: 7 February 2019

A facile and novel one-step hydrothermal method was provided for the preparation of Ni-Co double hydroxides (NC-DH), which was directly grown on carbonized cotton cloth (CCC) and used as advanced binder-free electrodes for supercapacitors. The effect of different concentration of Ni²⁺ and Co²⁺ in the initial reactant (C-Ni-x-Co-y) on microstructure and electrochemical performance were studied. The results showed that flake-like structure grown uniformly under an appropriate concentration, which was benefit to improve the electrochemical performance. The electrochemical tests revealed that the C-Ni-4-Co-8 electrode displayed the maximum specific capacitance of 4.19 F cm⁻² when the current density was 5 mA cm⁻² and excellent rate capability maintained at 3.05 F cm⁻² even at the high current density of 80 mA cm⁻². The electrodes of Ni-Co double hydroxides anchored on flexible conductive substrates with excellent electrochemical properties could be obtained by cost-effective method, which could be ascribed as a highly promising potential electrode material for energy storage devices.

Keywords: Ni-Co double hydroxide, carbonized cotton cloth, hydrothermal method, supercapacitor.

[FULL TEXT](#)

© 2019 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).