Hydrothermal Synthesis of Hierarchical Nickel- or Cobalt-Based Carbonate Hydroxides for Supercapacitor Electrodes

Yaling Li, Pengcheng Li, Zhiqing Xin, Zhicheng Sun, Meijuan Cao and Luhai Li*

Beijing Engineering Research Center of Printed Electronics, Beijing Institute of Graphic Communication, Beijing 102600, PR China

*E-mail: liluhai@bigc.edu.cn

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Nickel-, cobalt- and nickel-cobalt carbonate hydroxides were prepared with hydrothermal method and the crystal structure, thermal property and morphology were characterized. The electrochemical performance was also studied using the three-electrode method in 6M KOH electrolyte. Nickel carbonate hydroxide and nickel-cobalt carbonate hydroxide have fluffy and hierarchical structures and exhibit much higher specific capacity compared to the as-prepared cobalt carbonate hydroxide. The specific capacity of nickel carbonate hydroxide achieves up to $169.6 \text{ mA h g}^{-1}$ and that of the nickel-cobalt carbonate hydroxide reveals $127.4 \text{ mA h g}^{-1}$ at a current density of 1 A g^{-1} . The two kinds of carbonate hydroxides exhibit superior cycling stability and have great application prospect for supercapacitor electrodes.

Keywords: carbonate hydroxide; hydrothermal method; supercapacitors; electrochemistry;

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