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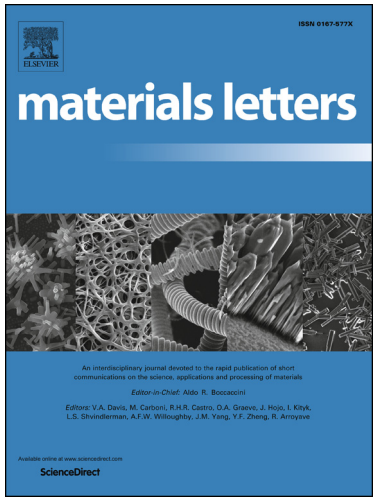

Nanoflower-like $Ni(OH)_2$ synthesis with chemical bath deposition method for high performance electrochemical applications

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Nanoflower-like $Ni(OH)_2$ synthesis with chemical bath deposition method for high performance electrochemical applications

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Abstract:

Flower-like $Ni(OH)_2$ nanostructured was synthesized by using simple chemical bath deposition (CBD) method as a binder-free electrode for supercapacitor. The nanowalls with thickness 50 to 70 nm were connected to each other forming pores, which further results in higher electrochemical performance by the virtue of easy transportation of electrolyte and ions to active mass. The maximum specific capacitance of flower-like $Ni(OH)_2$ is found 1065 Fg^{-1} at current density 15 mAs^{-1} with excellent rate capability.

Keywords: Supercapacitor, Ni foam, $Ni(OH)_2$, Metal oxide

1. Introduction:

Faster development of electronic and automotive area demands power sources having a higher energy density, excellent power density and long-term durability. Recently supercapacitor attracted attention as a promising candidate for energy storage due to high power density, fast charge-discharge and long cycle life[1]. Based on charge storage mechanism supercapacitor is classified into two categories electric double layer capacitor (EDLC) and pseudocapacitor. Electrostatic attraction ions from electrolyte are adsorbed on the surface of a electrode and form a double layer in case of EDLC while fast faradaic redox reaction is considered to be a responsible mechanism in pseudocapacitor[1]. The EDLC are constructed by using carbon-based materials like activated carbon, carbon aerogels, carbon nanotubes and graphene[2]. Conductive polymers and metal oxide/hydroxides are used as pseudocapacitor electrodes such as RuO_2[3], Fe_2O_3[1], $Ni(OH)_2$[4], Co_3O_4[5]. The pseudocapacitor shows higher capacitance than EDLC due to its additional charge transfer.