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Ordered corn-like $CuCo_2O_4$ nanoforests covering Ni foam for a high-performance all-solid-state supercapacitor

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Abstract

The ordered corn-like $CuCo_2O_4$ nanoforests were directly deposited on Ni foam by a hydrothermal/annealing method as a binder-free electrode for a symmetric supercapacitor. The ordered one-dimensional nanostructure can enhance an effective electron transport. The abundant sub-structure can be used to contribute to increasing a large number of active sites for Faradaic reactions. The binder-free loading can help to reduce the ohmic polarization during the charge/discharge process. For three-electrode configuration, the specific capacitance achieved 820 F/g at a current density of 2 mA/cm^2 and long-term capacity retention of ~ 94% after 1500 cycle. The symmetric device gained a high energy density of 17 W h/kg at a power density of 480 W/kg.

Keywords: Transition metal oxides, Ordered structure, Supercapacitor, Energy density, Stability