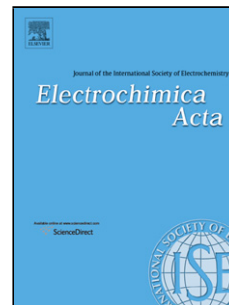


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Design and construction of three-dimensional flower-like CuO hierarchical nanostructures on copper foam for high performance supercapacitor

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Abstract

We have developed a simple and cost-effective one-step surface oxidation method to synthesize three-dimensional (3D) flower-like, similar to that of a blooming chrysanthemum, CuO hierarchical nanostructures directly on a copper foam, which is acting as the Cu source and the current collector. The as-prepared sample can be directly used as a binder-free electrode for supercapacitors. Benefiting from the novel synthesis strategy and the 3D connect/quasi-connect structures, the as-prepared CuO/copper foam electrode can provide massive active sites for redox reactions, high electronic conductivity, short diffusion pathway for ions and effectively electrolyte penetrating. These characteristics together with the synergy effect between CuO and copper foam substrate lead to a high capacitance of $1641.4 \text{ mF cm}^{-2}$, good rate capability (77.2% retention upon increasing the current density by 10 times) and good

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