Construction of High-Performance 3D Nanostructured Flower-Like Iron-Nickel Sulfide for Supercapacitor

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Introduction & Purpose
- The global energy crisis and environmental pollution have stimulated increasing attention to develop clean and renewable alternative energy sources.
- Supercapacitor as a non-polluting energy storage device captures people’s attention due to high-power density, fast charge–discharge rate, wide temperature range and long cycle life.

Methods
- In this work, we synthesized high-performance nanostructured flower-like iron-nickel sulfide grown on 3D nickel foam for energy storage application using a facile hydrothermal method.

Results and discussion

Summary
- The FeNiS electrode exhibited a superior performance for supercapacitor with a large areal capacitance of 13.2 F/cm² at the scan rate of 1 mV/s and 4.9 F/cm² at the current density of 5 mA/cm², respectively.
- The capacitance of FeNiS was more than 11 and 54 times higher than that of FeNiO and nickel foam at 5 mA/cm², respectively.
- In addition, FeNiS electrode showed the great stability of the charge-discharge study with 77.3 % charge retention after 5,000 cycles.
- Our study suggested that the synthesized nanostructured flower-like iron-nickel sulfide could be a promising material for energy storage applications.

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