Effects of Electrospinning Parameters on Morphological and Electrochemical Properties of Nickel Oxide Nanofibers for Flexible Supercapacitors

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Nickel nitrate → Electrospinning → Calcination at 650 °C → Nickel acetate

Capacitance (mF/cm²) → Areal current (mA/cm²)

Z' (ohm) → Z'' (ohm)
Introducing supercapacitors (SCs) as energy storage devices which combine the advantages of both batteries and capacitors. Electrode is the key factor influencing the overall performance of SCs. Electrospinning is a simple and versatile technique to produce a continuous fiber mesh with high surface area to volume ratio and high porosity.
Electrospinning parameters such as voltage and concentration were optimized to prepare nanostructured nickel oxide (NiO).

Using nickel acetate as a precursor produces NiO nanofibers as shown by scanning electron microscopy (SEM) image and Raman spectra.
Peaks in cyclic voltammetry curves confirm that energy is stored on NiO electrode | KOH electrolyte by redox reaction mechanism.

Capacitance values at a range of electrical current are calculated from the galvanostatic charging-discharging curves.

NiO nanofibrous electrode made from nickel acetate display better electrochemical performance in terms of capacitance and charge transfer resistance.