Electronic Supplementary Information (ESI)

Selective Synthesis of Nickel Oxide Nanowires and Length Effect on Their Electrochemical Properties

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SI1 Experimental details:

The synthesis of the NiO nanostructure/Ni foil: Firstly, Ni foils (1 cm × 5 cm) were soaked in a serial of LiOH solutions with different concentrations for 72 hours and washed by deionized water. Then the soaked Ni foils were heated to 800 °C in 2 hours and maintained for 1 hour in the air.

Characterizations: The phase analyses of the samples were performed by X-ray diffraction (XRD) on a SHIMADZU, XRD-6000 with Cu K_α radiation (λ = 1.5418 Å). The morphology of the as-prepared samples was observed on a Hitachi S-4800 field-emission scanning electron microscope (FE-SEM) at an acceleration voltage of 10.0 kV. The electrochemical measurements were carried out at CHI-660b electrochemical station (Shanghai). The NiO nanowires/Ni foil prepared under different conditions were directly used as electrode. The used electrolyte was 3 % KOH solution. Platinum foil was used as a counter electrode, and all potentials in this paper are referred to Ag/AgCl reference electrode.

SI2 Mass calculation of the obtained NiO nanocrystals:

The loading weights of active materials for the three NiO nanostructures are calculated to be 3.97 mg, 3.13 mg, and 3.50 mg, respectively. These weights are calculated as followed: Firstly we measured the weight of pure Ni foils, M_1 (0.62015 g, 0.61002 g, 0.61802 g) and the weight of NiO nanostructure/Ni, M_2 (0.62100 g, 0.61069 g, 0.61877 g), and then calculated the weights of the active NiO through the following formula.

$$2Ni + O_2 = 2\,NiO \quad \sim \quad \Delta m$$

$$149.4 \qquad 32$$

$$X \qquad M_2 - M_1$$

$$X = 149.4 \times (M_2 - M_1)/32 \text{ g}$$

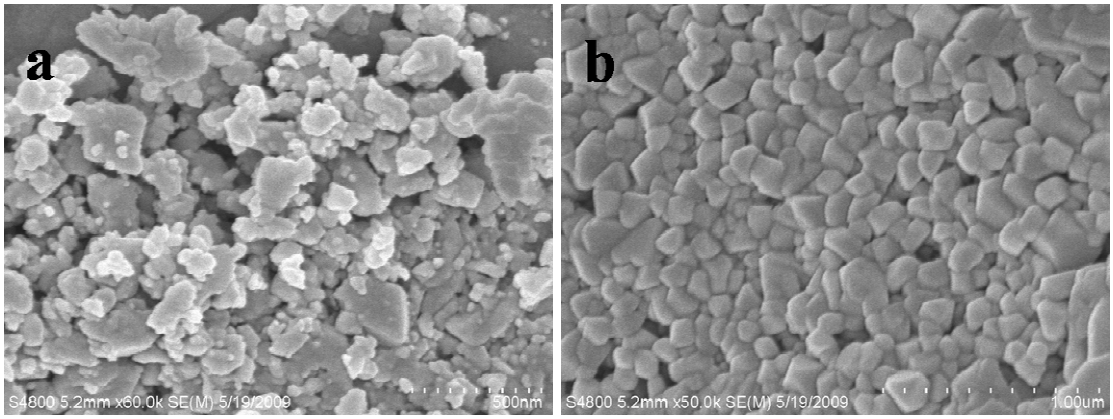

Fig. SI3 SEM images of the as-synthesized samples prepared by calcining (a) pure Ni foil and (b) Ni foil soaked in LiOH solution with a concentration of 60 g/L.

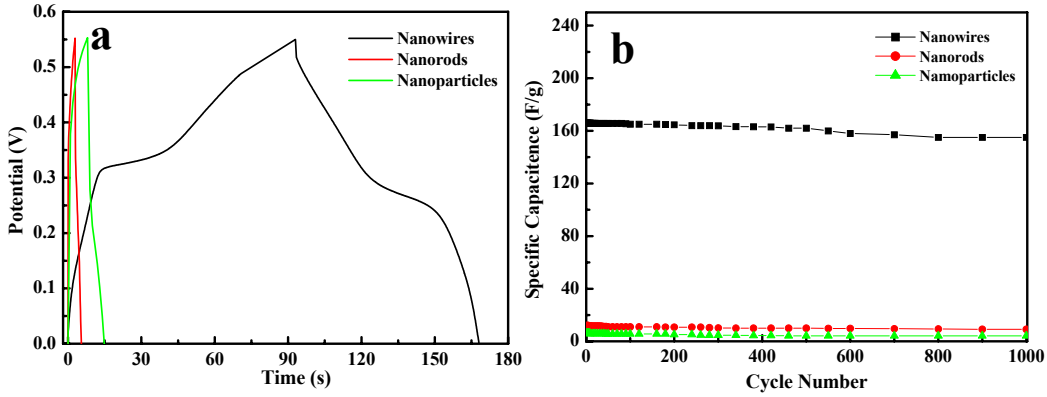

Fig. SI4 (a) charge-discharge curves of the obtained NiO nanostructures/Ni foils in the potential range from 0 to 0.55 V at 1.25 A/g; (b) Variation of specific capacitance with cycle number at 5 mA.

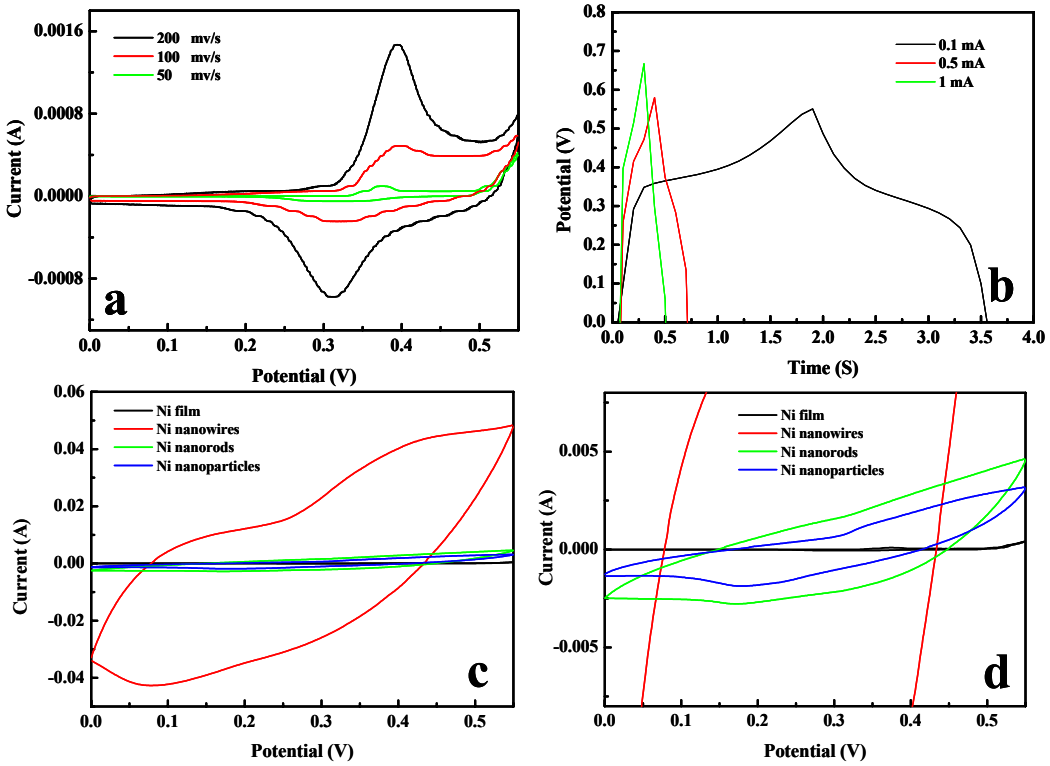

Fig. SI5 (a) Cyclic voltammetric curves of the pure Ni foil vs. SCE; (b) charge-discharge curves of the pure Ni foil; (c) Cyclic voltammetric curves of the pure Ni foil and different NiO nanostructures/Ni foil at 50 mV/s; (d) the amplification of (c).