

SUPPORTING INFORMATION

Three-Dimensional Metallic Nickel Nitride Nanosheets: Free Standing and Flexible Electrode for Lithium Ion Batteries and Supercapacitors

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Capacity Contribution of the Carbon Cloth

Method 1

The capacity contribution from the carbon cloth substrate is quite less compare to the total capacity of the electrode. We can calculate the capacity contribution of the carbon cloth based on the calculation below;

The total mass of the electrode (0.64 cm²) is around 10.9 mg (~2.8 mg VN@SnS₂, 8.1 mg carbon cloth). The electrode has a capacity of ~2.1 mAh/cm², so the capacity for the total electrode is 192 mAh/g. As the carbon cloth has a capacity of ~47 mAh/g, the total contribution of carbon cloth is calculated to be around;

$$40 \text{ mAh/g} \times 10 \text{ mg/cm}^2 = 0.40 \text{ mAh/cm}^2.$$

Therefore, the capacity percentage of the carbon cloth is roughly $0.4/2.1 = 19\%$. If we subtract the contribution of carbon cloth, the capacity for the VN@SnS₂ electrode along can be estimated

$$(2.1 - 0.4) \text{ mAh cm}^{-2} / 2.8 \text{ mg cm}^{-2} = 607 \text{ mAh/g}$$

Based on our calculation, the capacity derived here (607 mAh g⁻¹) is almost the very close to that of the experimental result according to Figure 4a (593 mAh g⁻¹).

Method 2

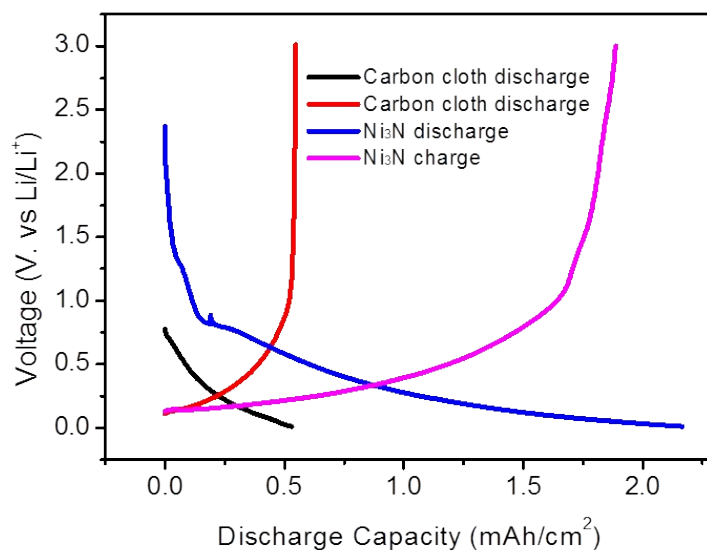


Figure S1. Charge-discharge profiles of the pristine carbon cloth and CC-VN@SnS₂ based on capacity measured in mA h.cm². The capacity contribution of the carbon cloth derived from this plot is 21%. This method is adapted by Xiong *et al.* and our group. {Balogun, 2015 #503;Xiong, 2013 #384}

Herein, we employed the two methods used in calculating the capacity contribution of the carbon cloth reported by Fan's group, Xiong's group and our group and the results show similar contribution further justifying the carbon cloth showed less capacity contribution to the total electrode capacity reported.

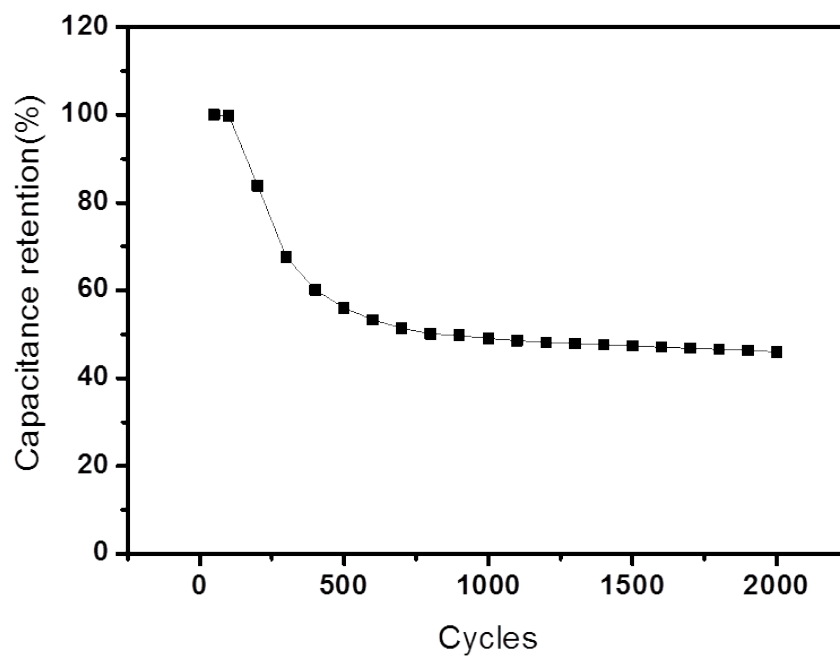


Figure S2. Cyclic performance of the 3D Ni₃N/carbon cloth composite for supercapacitor.