

Supporting Information

Large scale synthesized sulphonated reduced graphene oxide: a high performance material for electrochemical capacitor

Haibo Li^{a,b}, Ye Wang^a, Yumeng Shi^a, Jin Li^b, Lijun He^b and Hui Ying Yang^{a*},

a Pillar of Engineering Product Development, Singapore University of Technology and Design, 20 Dover Drive, Singapore 138682

b Key Laboratory of Ningxia for Photovoltaic Materials, Ningxia University, Helanshan Rd., Yinchuan, Ningxia, P.R. China 750021

1. Experimental section

1). Electrochemical measurement

Typical three electrodes method: A nickel foam coated with RGO/SRGO served as the working electrode, a platinum foil electrode and a saturated calomel electrode (SCE) served as counter and reference electrodes respectively. The measurements were carried out in a 1 M Na₂SO₄ aqueous electrolyte at room temperature. Cyclic voltammograms (CV), galvanostatic charge/discharge and electrochemical impedance spectroscopy (EIS) were measured by electrochemical workstation (Biglogical VMP3). CV tests were carried out from -0.6 V to 0.4 V (vs. SCE) at different scan rates of 1, 5, 10, 50, 100, 200 and 500 mV/s. Galvanostatic charge/discharge curves were measured in the same potential range with the CV test at different current densities of 200, 500, 1000 and 2000 mA/g, and EIS measurements were explored in the frequency range from 100 kHz to 0.1 Hz at open circuit potential with an AC perturbation of 5 mV. The mass normalized specific capacitance of the electrode can be calculated according to $C = \int idt/mVv$, where C is the mass normalized specific capacitance (F/g), i is the current (A), V is the potential (V), v is the potential scan rate (V/s), m is the mass of the electroactive materials in the electrodes (g).

2. Supplementary Results

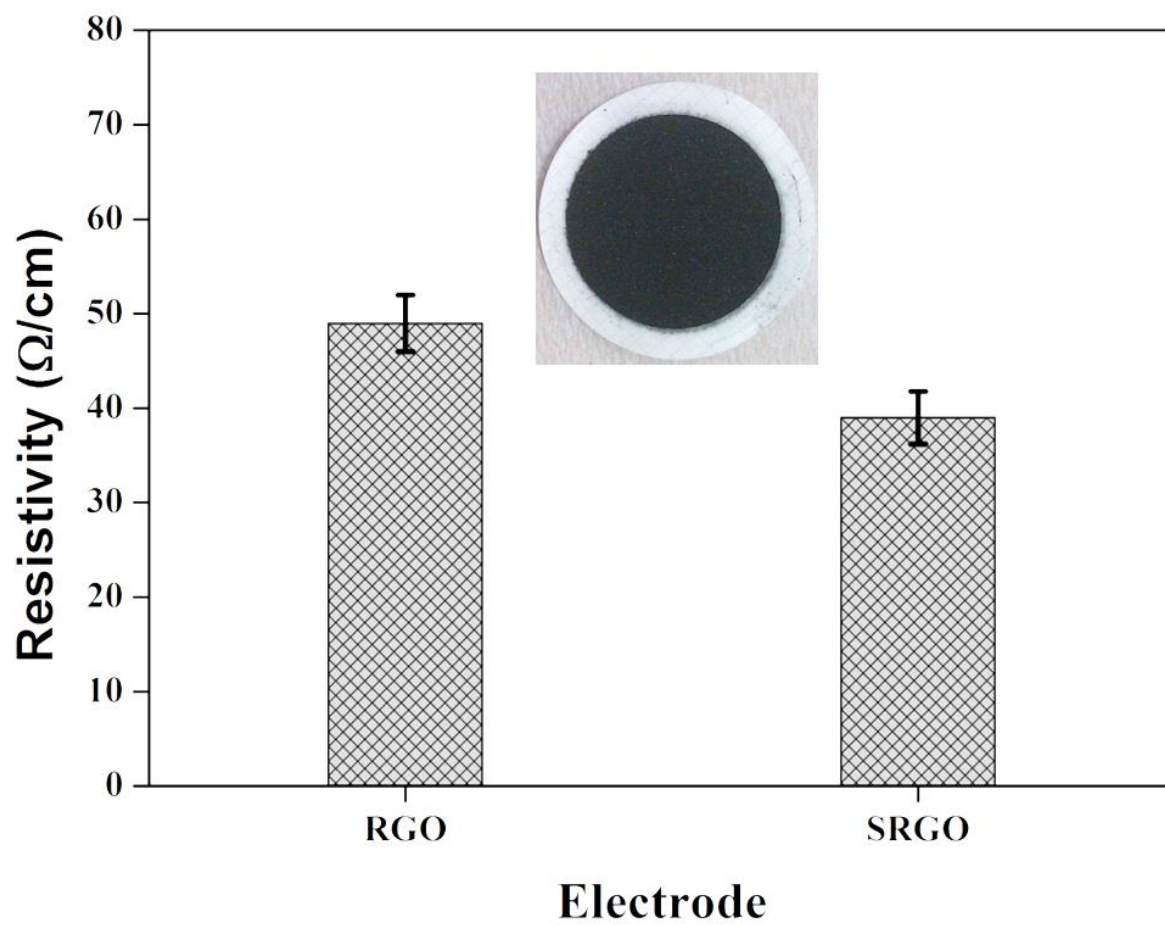


Figure S1 the bulk resistivity of RGO and SRGO samples, inset is a digital image of SRGO film.

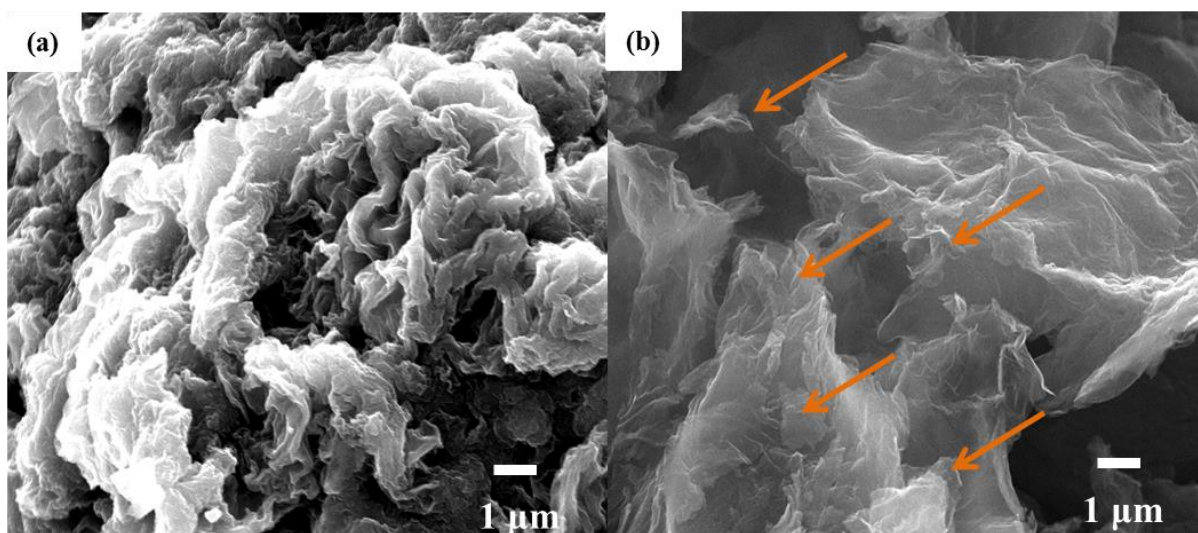


Figure S2 the SEM image of (a) RGO and (b) SRGO. The arrow indicates the small pieces of SRGO nano-sheets presenting on the SRGO nano-sheets, respectively.

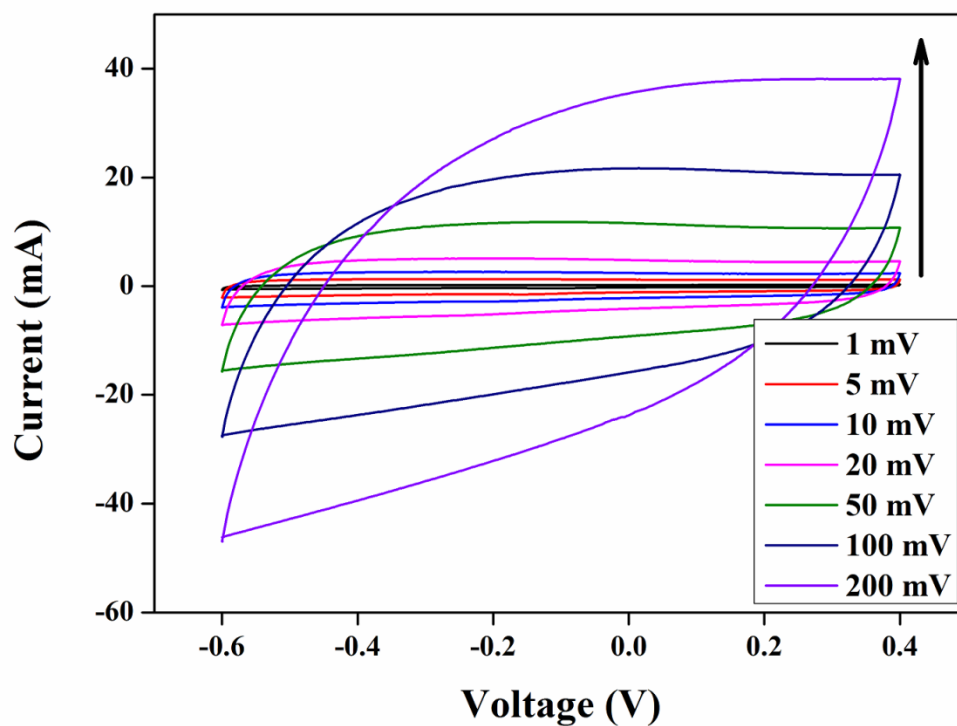


Figure S3 CV curves of RGO at various scan rates (1, 5, 10, 20, 50, 100 and 200 mV/s)