

Electronic Supplementary Information (ESI)

Experimental Information

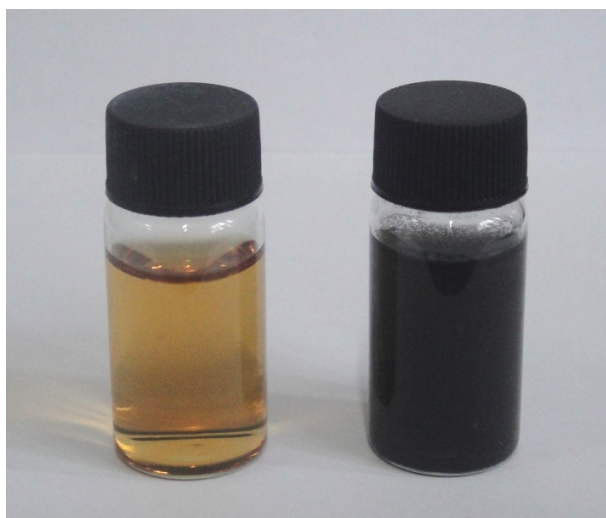
All chemicals (analytical grade or higher) were used as received from Sigma-Aldrich without any further purification. All solutions were prepared with deionised water of resistivity not less than 18.2 MΩ cm. Electrochemical characterization was carried out at room temperature using a Modulab (Solartron Analytical). For measuring the cyclic voltammetric responses (figure 2 main text), the modified electrodes were fabricated by pipetting a certain volume of solution (15 μL) onto a glassy carbon electrode and allowing to dry at room temperature under nitrogen flow in order to eliminate oxidation of the graphene by the presence of atmospheric oxygen. For capacitance measurements, the working electrode was fabricated by first mixing prepared graphene oxide (or graphene sheets) with polytetrafluoroethylene (PTFE) at a weight ratio of 100:1. The prepared mixture was then pressed onto a nickel foam nickel under a pressure of 10 MPa for 30 seconds. A three electrode system was used with this fabricated working electrode with a platinum sheet as counter electrode and a saturated calomel reference electrode (SCE) (Radiometer, Copenhagen, Denmark) completing the circuit. The electrolyte utilized was 1 M Na₂SO₄ in an aqueous solution.

Materials Characterisation

Figure 1 depicts the digital image of Graphene oxide (left image) and Graphene sheets (right image) in aqueous solution both at a concentration of 0.27 mg/mL. These solutions can be kept for up to 3 weeks without aggregation.

ESI Figure 1

Digital image of graphene oxide (GO, left image) with that of graphene sheets (GS, right image)



XPS chemical analysis of the GO and GS were performed with a VG-Microtech Multilab electron spectrometer. The samples were dried under vacuum. The as-made electrodes were kept in vacuum until taken out for testing. ESI figure 2 depicts a typical XPS spectra of graphene oxide and graphene sheets. Analysis of the spectra reveals the presence of 82.68 % atomic carbon and 14.31% atomic oxygen for the GS while for the GO the presence of 66.21% atomic carbon and 32.82 % atomic oxygen was deduced which is similar to other literature reports.

SI Figure 2. XPS spectra of graphene oxide (GO) and graphene sheets (GS). In the lower figure, GO is the solid line while GS is the dotted line.

