

Electronic Supplementary Information (ESI)

Formation of snowman-like Pt/Pd thin film and Pt/Pd/reduced-graphene oxide thin film at liquid- liquid interface by using of organometallic complexes, suitable for methanol fuel cell

S. Jafar Hoseini*, Mehrangiz Bahrami and Modarres Dehghani

Graphene oxide was prepared using modified Hummers method from flake graphite⁵⁰⁻⁵² (Merck Company). Briefly, a flask containing 1 g of graphite and 0.75 g of NaNO₃, was placed in the ice-water bath. 75 ml of H₂SO₄ was added with stirring and then 4.5 g of KMnO₄ were slowly added over about 1 h. After the mixture was stirred vigorously for 5 days at room temperature, 140 ml 5 % H₂SO₄ aqueous solution was added over about 1 h with stirring , and the temperature was kept at 98 °C. The temperature was reduced to 60 °C, 3 ml of H₂O₂ (30 wt% aqueous solution) was added, and the mixture was stirred for 2 h at room temperature. As-prepared graphene oxide was suspended in ultra-pure water to give a brown dispersion, which was subjected to dialysis to completely remove residual salts and acids. Resulting purified graphene oxide powders were collected by centrifugation and air-dried. Graphene oxide powders were dispersed in water to create 0.05 wt% dispersion. Then, the dispersion was exfoliated through ultrasonication for 1 h, which the bulk graphene oxide powders were transformed into GO nanoplatelets.

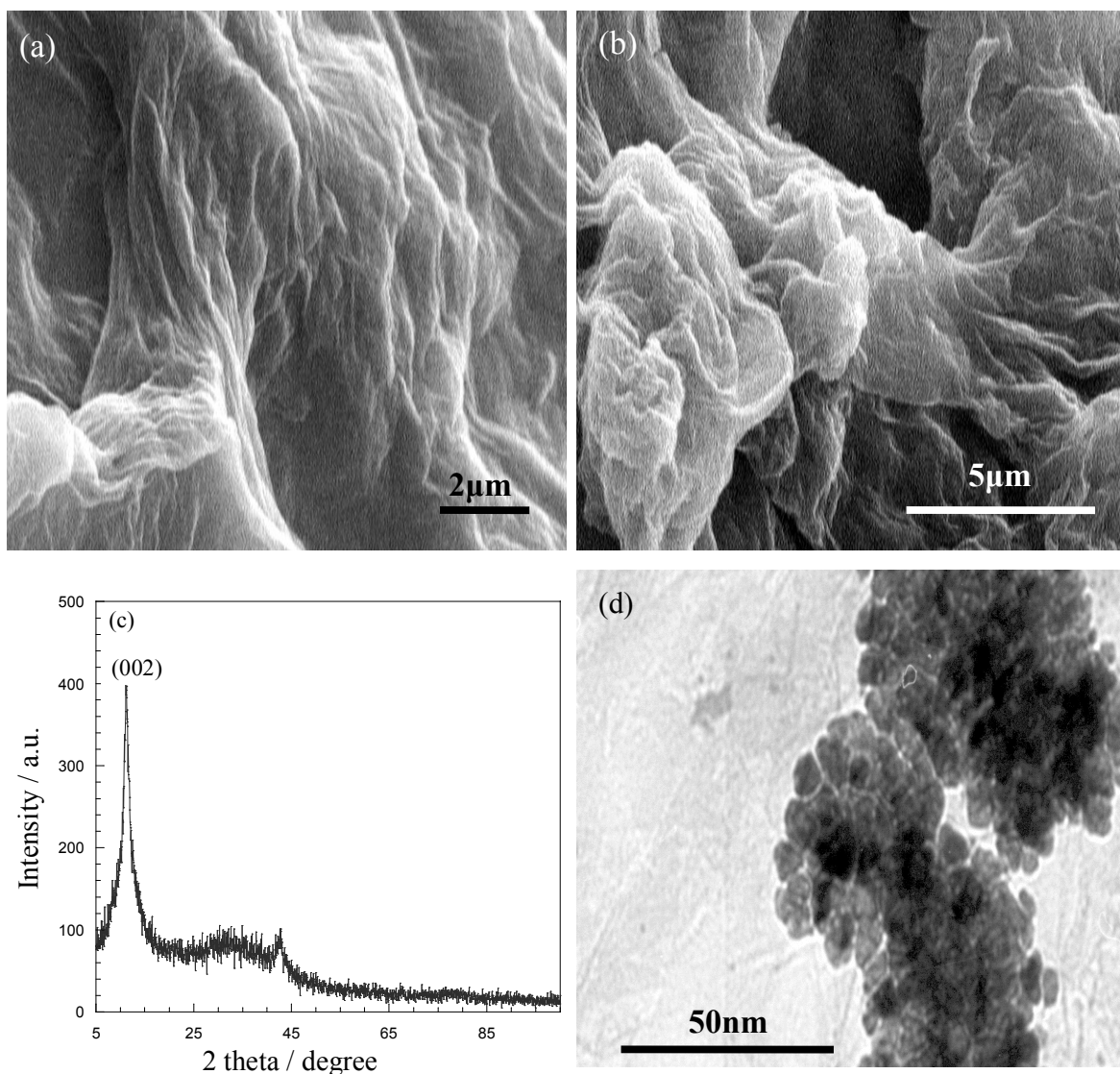


Fig. S1 (a, b) SEM images of the GO, (c) X-Ray diffraction pattern of GO, (d) TEM image of GO.