Electronic Supplementary Information

(ESI)

Trigol based reduction of graphite oxide to graphene with enhanced charge storage activity

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S1 Graphite Oxide (GO) synthesis scheme.

Experimental Details

Graphite oxide (GO) was prepared by a modified Hummers scheme (ref. no. 29) from graphite powder (325 mesh purchased from Alfa Aeser) (ref. no. 26). In this procedure, 5 g of graphite powder and 3.75 g of $NaNO_3$ were mixed in a round bottom flask. Then 375 mL concentrated H_2SO_4 was added under constant stirring in an ice bath. Subsequently 22.5 g of $KMnO_4$ was added to this slurry very slowly for more than about 1 h. The cooling was continued further for about 2 h. The ice bath was then removed and the mixture was allowed to stir for five days at room temperature. A brown color slurry was obtained. To this slurry 700 mL of 5 wt % H_2SO_4 aqueous solution was added over a duration of more than about 1 h under stirring at 98 ºC. The resulting mixture was once again subjected to additional stirring of 2 h. Then the heating was stopped and the flask was allowed to cool down to about 60 ºC. Finally 15 mL of 30 wt % H_2O_2 was added and the mixture was stirred for an additional 2 h at room temperature. The product was purified by repeating the centrifugation cycle given below 15 times.

An aqueous solution of 3 wt% H_2SO_4/0.5 wt% H_2O_2 (2 Liter) was added to the GO cake obtained as stated above and the mixture was subjected to bath sonication for 30 mins. It was then centrifuged and the supernatant liquid was removed. The GO slab thus obtained was subjected to centrifugation three times with 3 wt% HCl (2 Liter) solution and one time with D. I. water. Acetone was added to the settled product for the removal of the remaining acid. Finally, the product was dried at 60 ºC.

Figure 1 Thermogravimetric analysis (TGA) plot for graphite oxide (GO), trigol reduced graphene (TRG) and hydrazine reduced graphene (HRG)

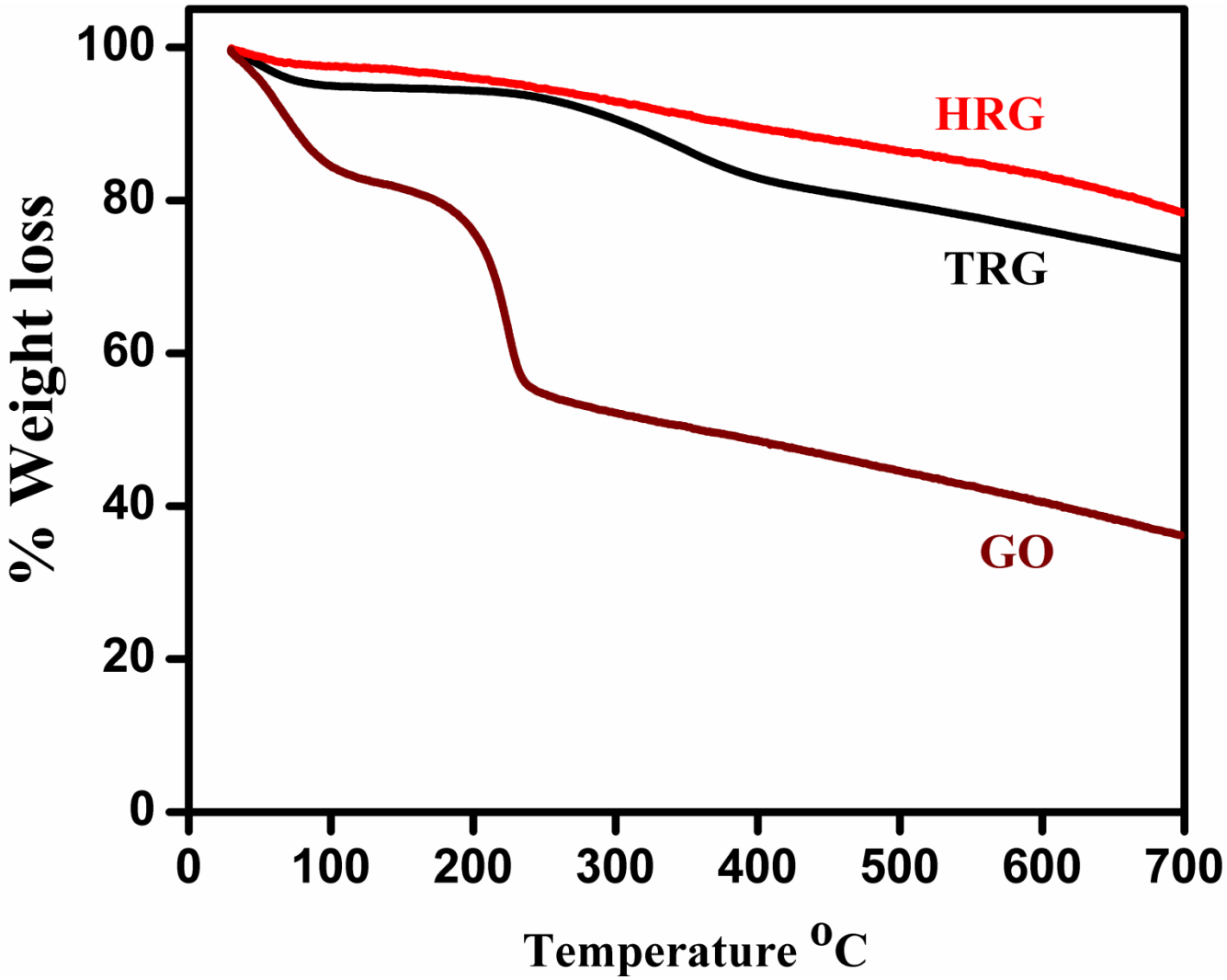

Figure 2 FE-SEM and HRTEM images of trigol reduced graphene (TRG)

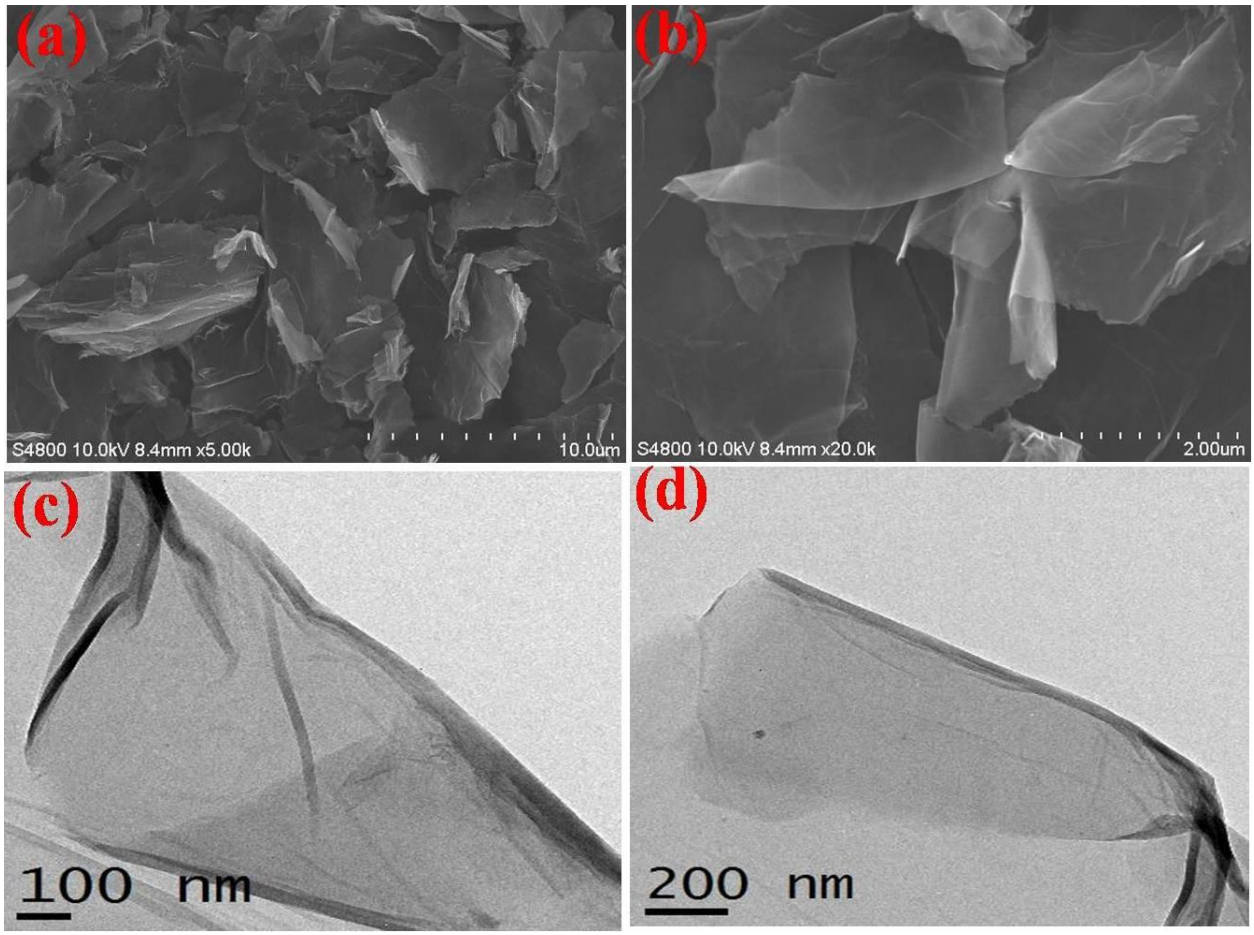

Figure 2 (a and b) FE-SEM images of TRG, (c and d) HR-TEM images of TRG.