

Supplementary Information

Rolle of electrochemically functionalized graphene nano-fillers on the structural performance of epoxy based composite.

Sumanta Kumar Sahoo^a, Bankim Chandra Ray^b, Archana Mallik^{a,*}

^aElectrometallurgy and Corrosion Laboratory, ^bComposite Materials Group, Metallurgical and Materials Engineering Department, National Institute of Technology Rourkela, Rourkela 769 008, Odisha, India.

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* Corresponding author:
E-mail: archananitrkl@gmail.com; Fax: +91-661 2472926;
Tel: +91-661 2462558

Electrochemical synthesis of *f*-GNSs

The electrolytic cell configuration consists of a high-quality pyrolytic graphite sheet of exposing volume of 0.45 cm³ as working electrode (WE) separated by 1 cm to the graphite counter electrode. Initially, a high negative DC bias of 10 V for 30 s followed by 3 V for 15 min was applied to the WE to serve a dual purpose, i.e., to make the availability of surface as well as internal lattice pores of graphite electrode for efficient intercalation. Then the cathodic treated WE have been swapped to the anodic terminal for the anionic intercalation and subsequent exfoliation with ramping applied bias from 0-8 V. Aftermath, the intercalation and exfoliation at a constant voltage of 8 V was carried out till the synthesis of the desired amount of exfoliated graphene nanosheets has been obtained. The obtained mixture of multilayer graphene-graphite sheets has been further disintegrated by probe sonication at 30 kHz for about 3 h. The obtained colloidal was centrifuged at 6000 rpm for 45 min, and supernatant *f*-GNSs is hence collected.

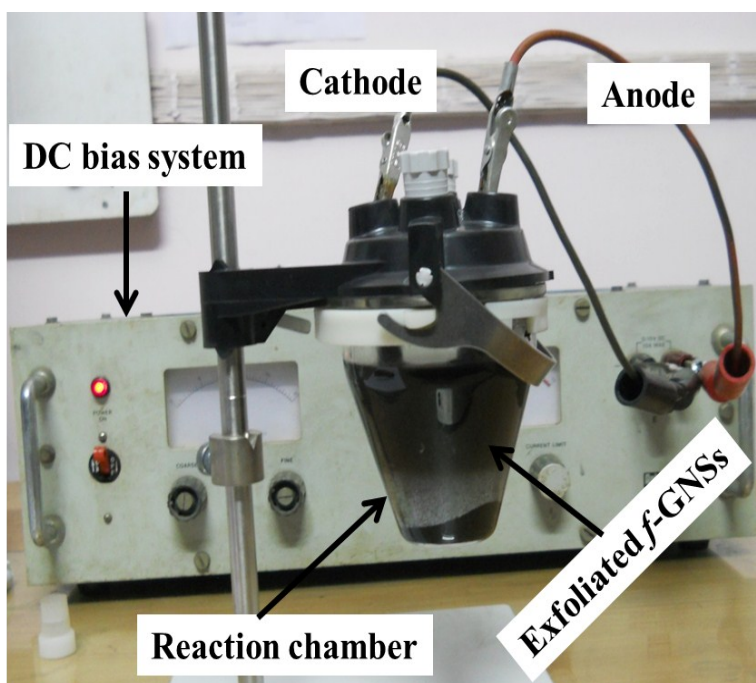


Fig. S1: Electrochemical exfoliation technique.

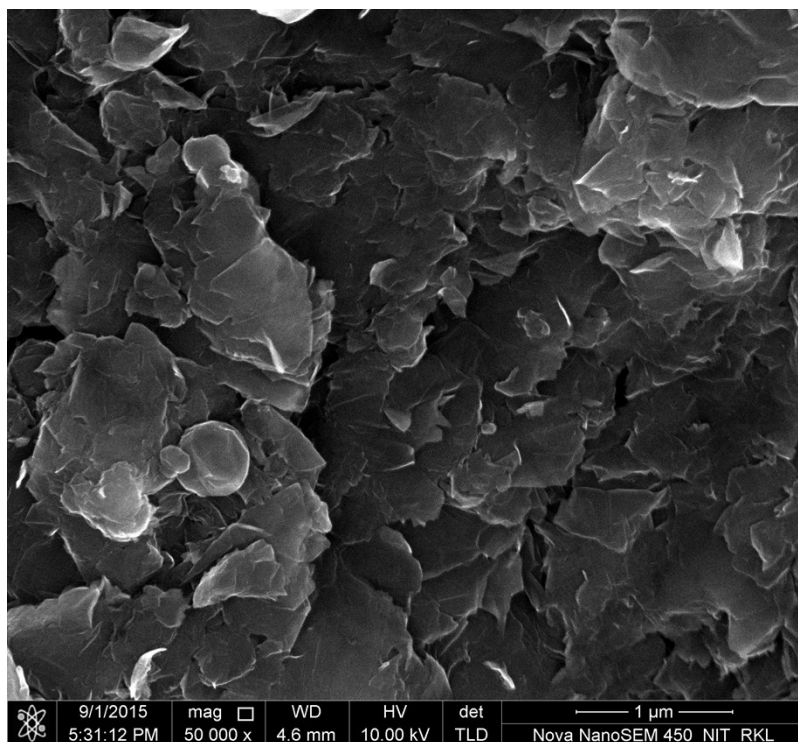


Fig. S2: FESEM of exfoliated graphene sheets.

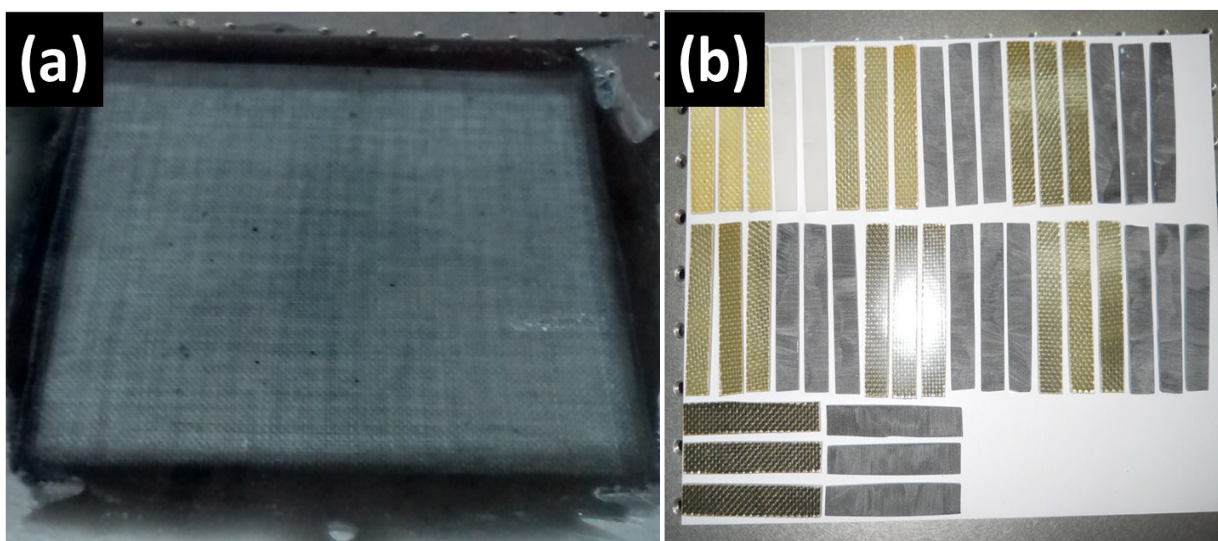


Fig. S3: (a) GEG polymer composite fabricated sheet and (b) sliced sample for 3-point bend test as per ASTM D7264 standard.

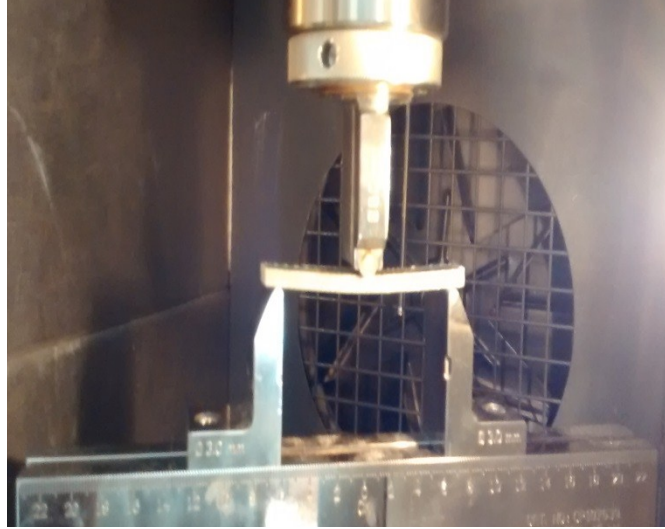


Fig. S4: Mechanical test of composite specimen by Instron 5967.