Supporting Information

EMI and Microwave absorbing efficiency of polyaniline functionalized reduced graphene oxide@γ-Fe_2O_3@Epoxy Nanocomposite

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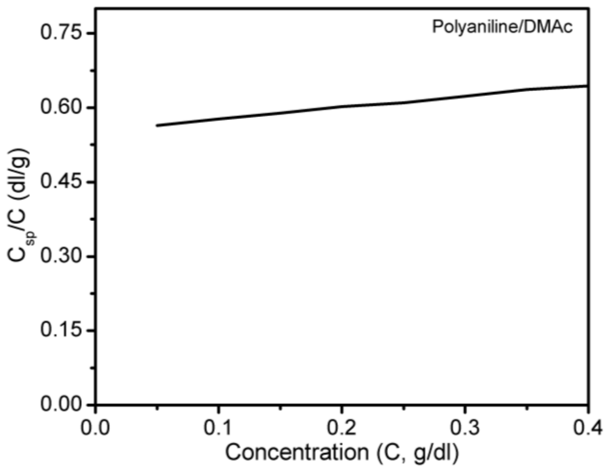


S1: Reduced viscosity versus concentration of PAni at 25 °C[1, 2]

Viscometry method has been used to evaluate the intrinsic viscosity at 25 °C.

Reduced viscosity (η_{sp}/C) = η_{rel}-1/C

Relative viscosity (η_{rel}) = $\frac{\eta s}{\eta o} = \frac{ts}{to}$

Where, η_s and η_o are viscosity and t_s and t_o are the time in second of samples and solvent (DMAc) respectively.

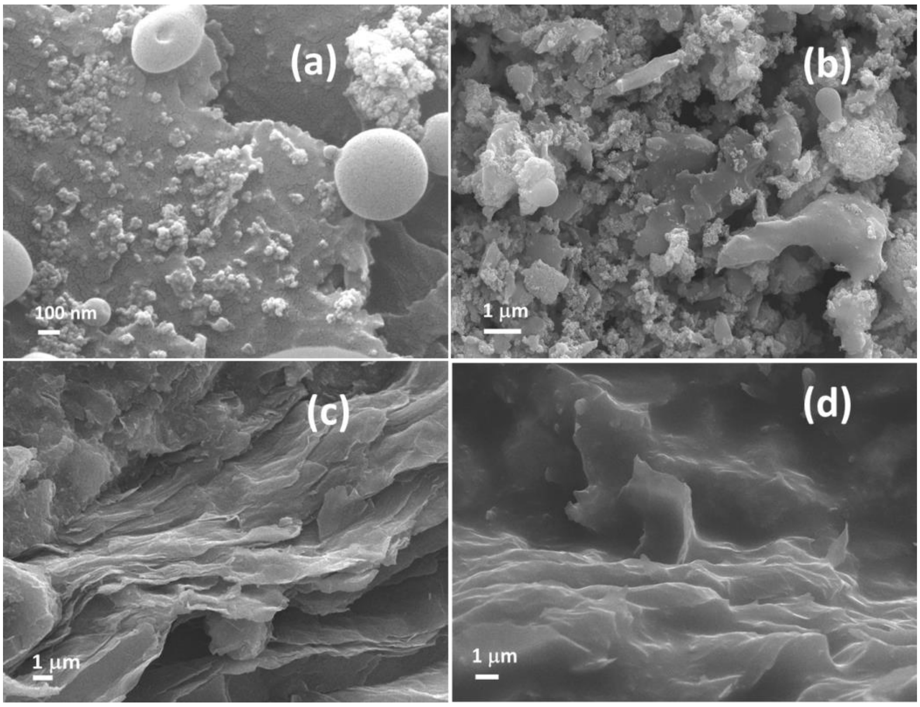
Intrinsic viscosity (η) = $(\eta_{sp}/C)_{c=0}$ ……………….. (1)

Mark Houwink equation (2) is used to determine the weight average molecular weight of PAni

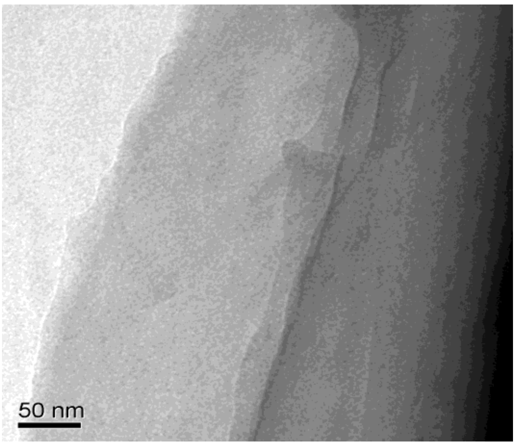
$\eta = KM_w^a$ …………………….. (2)

where, Mw is weight average molecular weight, K (52.63 × 10-5 dl/g) and a (0.7546) are constant for particular polymer[1,2].

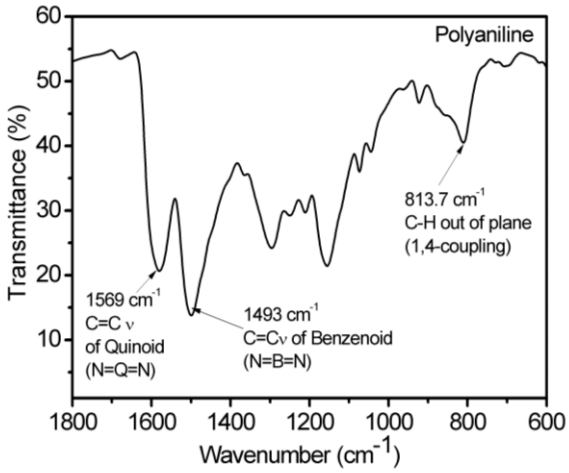
Intrinsic viscosity of PAni was observed to be 0.548 dl/g from intercept as shown in S1 graph. The M_w of PAni is 9951 calculated by using equation 2.



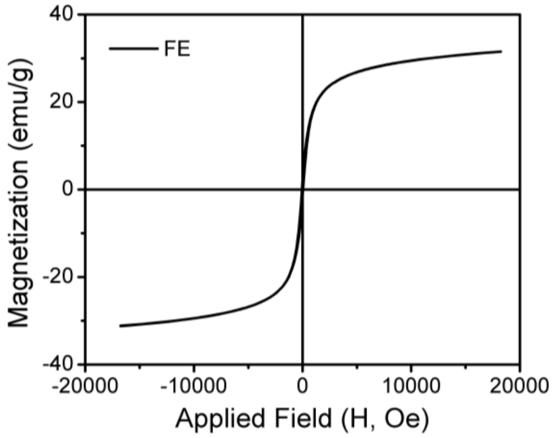
S2: FESEM images of rGO@PAni@Fe_2O_3 filler (a) (1:1), (b) (3:1), and rGO@PAni@Fe_2O_3@Epoxy Nanocomposite 60 wt % (c) (1:1), (d) (3:1)



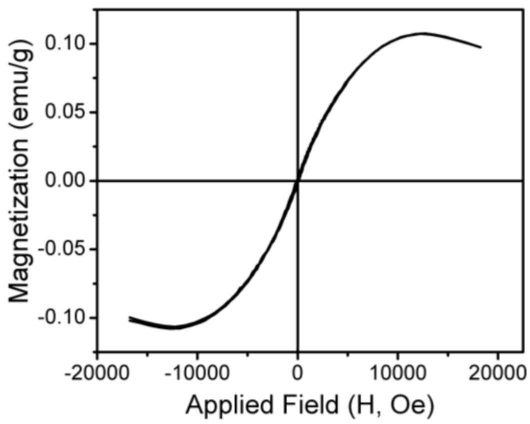
S3: TEM of rGO



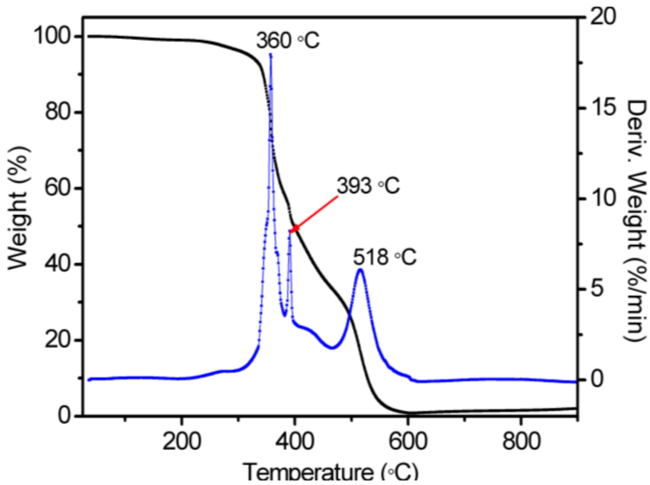
S4: FTIR of Polyaniline [1]



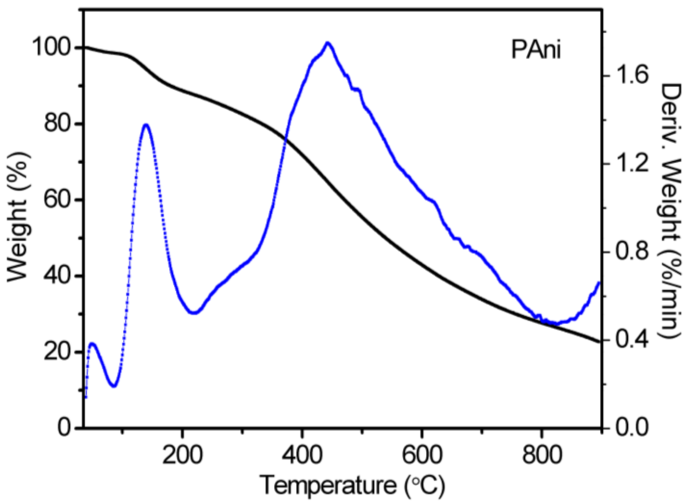
S5: VSM of Fe_2O_3@Epoxy (FE) nanocomposite



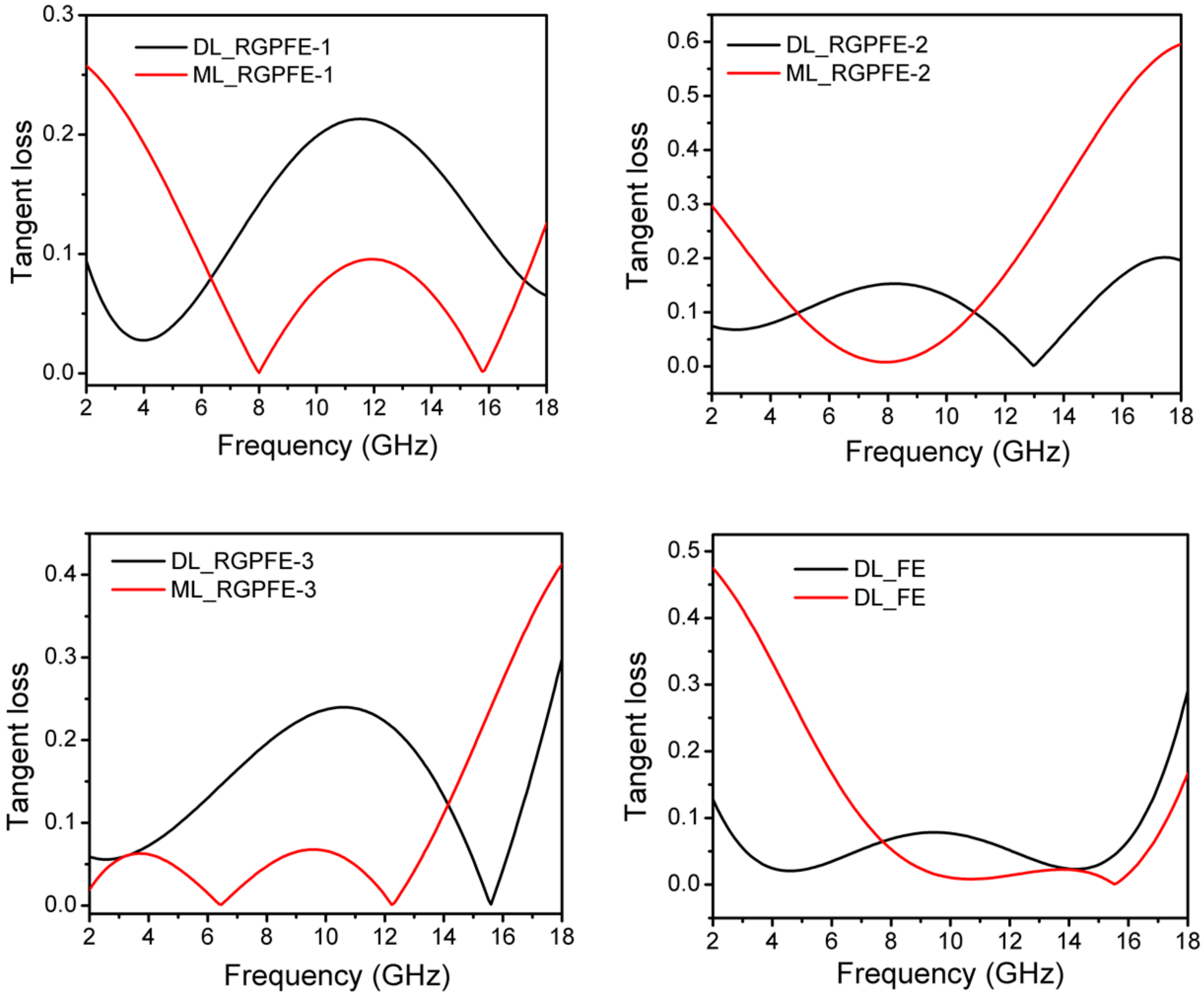
S6: VSM of PAni



S7: TGA of neat epoxy



S8: TGA of Polyaniline



S9: Dielectric tangent loss (DL) and Magnetic tangent loss (ML) of RGPFE and FE nanocomposites

S10: Table shows the microwave absorption in X-band frequency region

Sample's Name	Frequency	RL (dB)	% Microwave Absorption
RGPFE-1	10.5	-9.49	88.75
RGPFE-2	7.74	-5.93	74.47
RGPFE-3	8.47	-10.26	90.58
FE	10.64	-2.37	42.05

References:

1. H. R. Tantawy, D. E. Aston, J. R. Smith and J. L. Young, A Comparison of Electromagnetic Shielding with Polyaniline Nanopowders Produced in Solvent-limited Conditions, *ACS Appl. Mater. Interfaces*, 2013, **5**, 4648–4658.
2. H. Zengin, E. Bayir and G. Zengin, Solution properties of polyaniline/carbon particle composites, *J. Polym. Eng*., 2016, **36**, 3, 299–307.