Supporting Information

Multi-stimuli responsive smart elastomeric hyperbranched polyurethane/ reduced graphene oxide nanocomposites

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$$E_{NC} = E_P \left[\frac{3}{8} \frac{1 + \eta_L \zeta V_C}{1 - \eta_L V_C} + \frac{5}{8} \frac{1 + 2\eta_T V_C}{1 - \eta_T V_C} \right] \qquad (1)$$

$$E_\parallel = E_P \left[\frac{1 + \eta_L \zeta V_C}{1 - \eta_L V_C} \right] \qquad (2)$$

$$\eta_L = \frac{\left(E_{RGO}/E_P \right) - 1}{\left(E_{RGO}/E_P \right) + \zeta} \qquad (3)$$

$$\eta_T = \frac{\left(E_{GO}/E_P \right) - 1}{\left(E_{GO}/E_P \right) + 2} \qquad (4)$$

Where E_P, E_{RGO}, E_{NC} and $E_\parallel$, are young's modulus of HBPU, RGO, nanocomposites with randomly distributed RGO and aligned parallel to the surface of the sample, respectively. ζ and V_C are diameter to thickness ratio and volume fraction of RGO, respectively. The parameters implemented in the calculation are determined as follows.[1,2]
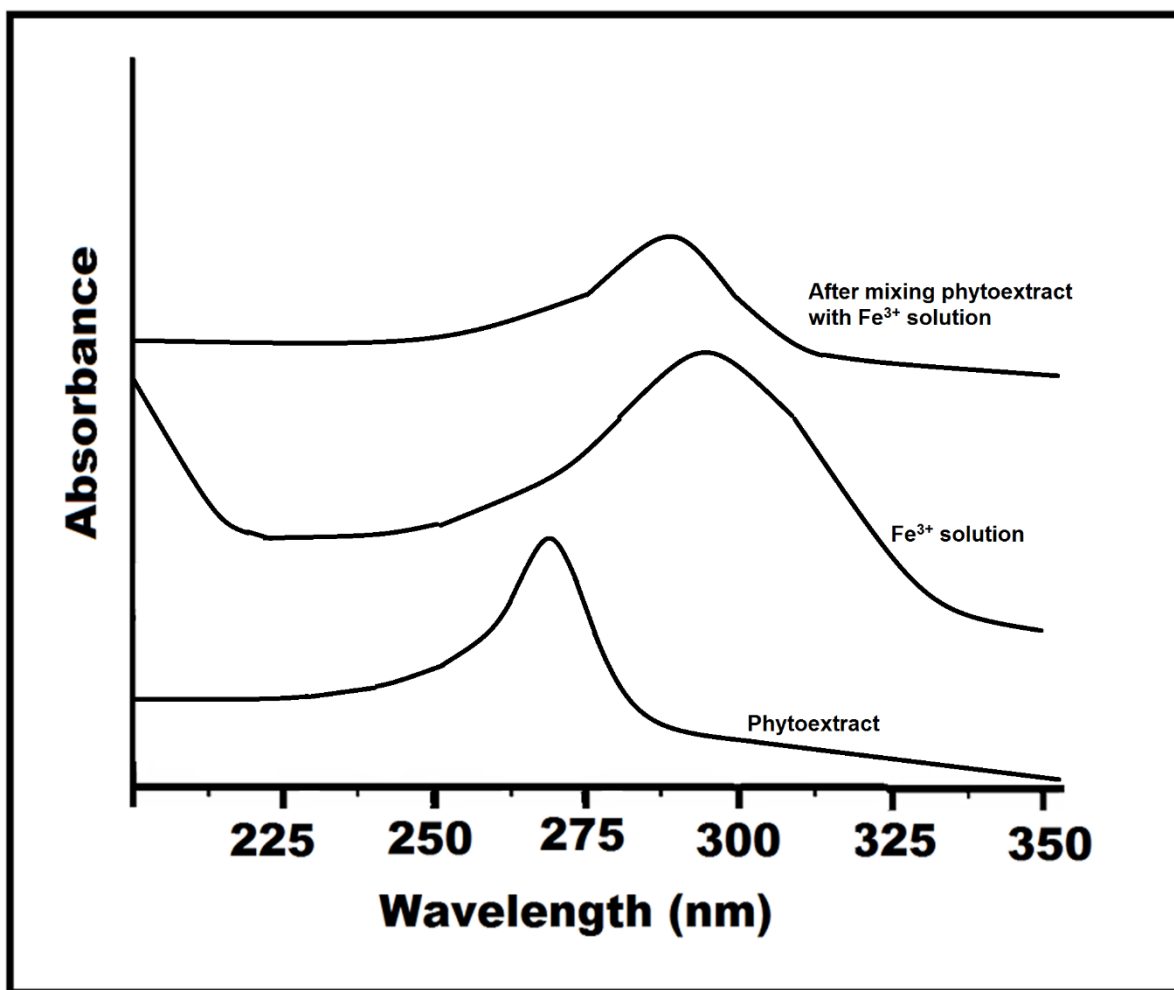
Fig. S1 UV-visible spectra of aqueous phytoextract, Fe^{3+} solution and their complex.

Table S1 Crystalinity of HPU and HPU/ RGO nanocomposites

Sample	T_m (°C)	Crystallinity (%)
HPU	48.3	26.60
HPU/RGO0.5	50.3	29.25
HPU/RGO1.5	51.2	33.56
HPU/RGO2.5	52.7	34.39

Reference

1. J. J. Liang, Y. Huang, L. Zhang, Y. Wang, Y. F. Ma, T. Y. Guo and Y. S. Chen, *Adv. Funct. Mater.* 2009, **19**, 2297.
2. C. Gomez-Navarro, M. Burghard and K. Kern, *Nano Lett.*, 2008, **8**, 2045.