Supporting Information for

In Situ Thermal Reduction of Graphene Nanosheets Based Poly(methyl methacrylate) Nanocomposites with Effective Reinforcements

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Gel fraction measurement

In order to investigate whether the MGO could potentially act as a giant cross-linking point during the miniemulsion, a gel fraction measurement was conducted using tetrahydrofuran as solvent, and the sample was extracted to remove the soluble polymer materials for 24h. Subsequently the residual gel was dried to a constant weight under vacuum at 60 °C. Therefore, the gel fraction of sample could be calculated by the following equation (Eq. (S1)):

$$Gel\ fraction = \frac{W_2}{W_1 - W_0} \times 100\% \qquad \text{Eq. (S1)}$$

Where W_1 and W_2 are the weights of the dried product before and after extraction, respectively and W_0 is the weight of the MGO incorporated into the sample.

According to the Eq. (S1), the calculated gel fraction of the sample is 4.08%, which could be attributed to the MMA molecules enter the interlayer of MGO sheets, then copolymerize with the double bonds of MGO and a small part of multifunctional MGO may act as a cross-linking point and connect to form a cross-linked gel during the polymerization, and this gel couldn't be solubilized by the solvent.

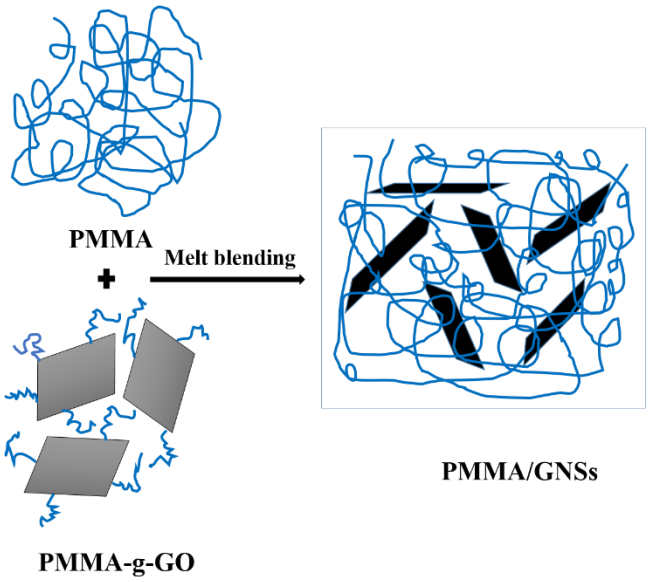

Figure S1. Schematic of interactions between PMMA-g-GO nanosheets and PMMA macromolecules. The grafted PMMA molecular chains on GO nanosheets have good interfacial compatibilization with the PMMA macromolecules, which is beneficial to prevent the restacking of GNSs, resulting good distribution of GNSs in PMMA matrix.

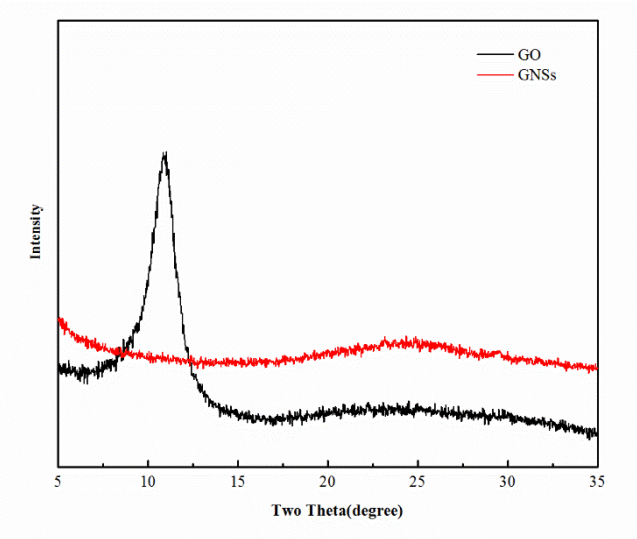

Figure S2. XRD patterns of GO and GNSs. No peak is observed in the XRD patterns for GNSs. This finding does not necessarily require the absence of all stacking, but it demonstrates the disordered stacking structure of the GNSs.

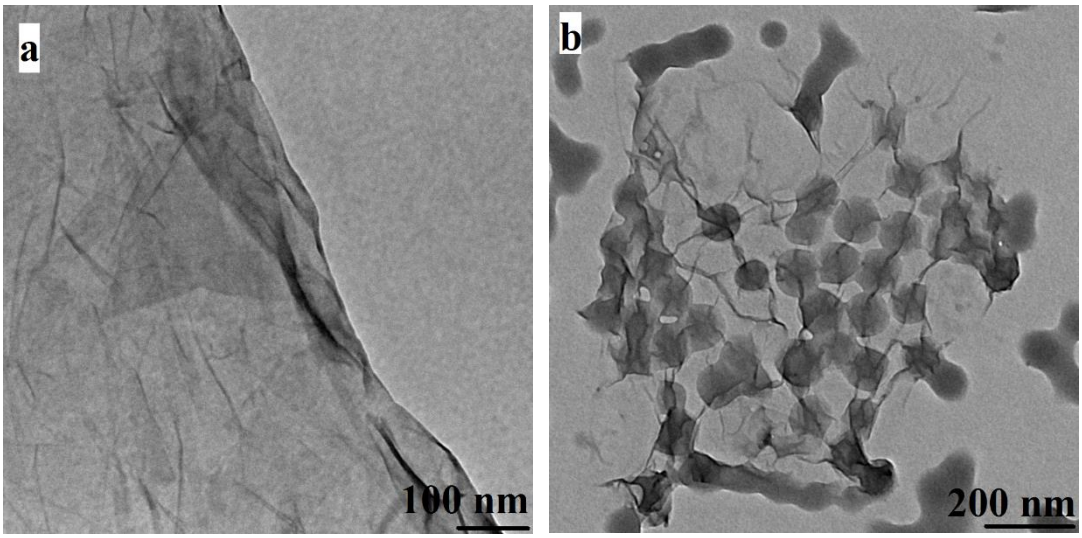

Figure S3. TEM images of (a) MGO and (b) PMMA-g-GO. In Figure S3 (a), the MGO shows restacked few-layers structure, correspond to the hydrophobicity of MGO after functionalization. Figure S3 (b) shows that PMMA microspheres grafted to the edges of MGO.

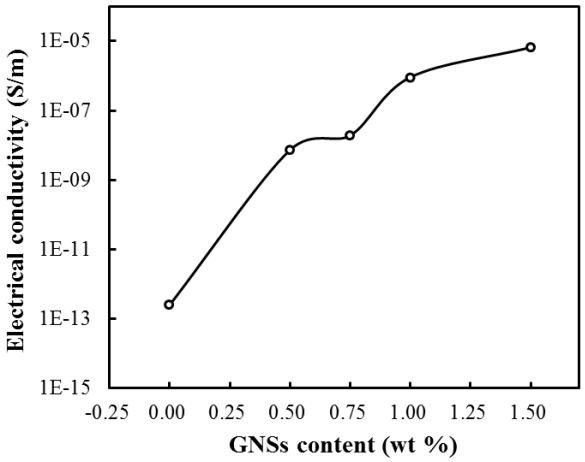

Figure S4. Electrical conductivity of PMMA/GNSs nanocomposites with various GNSs loadings.