Electronic Supplementary Information

Graphene Oxide/Rhodanine Redox Chemistry and Its Application in Designing High-Performance Elastomer/Graphene Composites

Zhijun Yang, Wenyi Kuang, Peijin Weng, Zhenghai Tang and Baochun Guo*

Department of Polymer Materials and Engineering, South China University of Technology, Guangzhou 510640, China. E-mail: psbcguo@scut.edu.cn

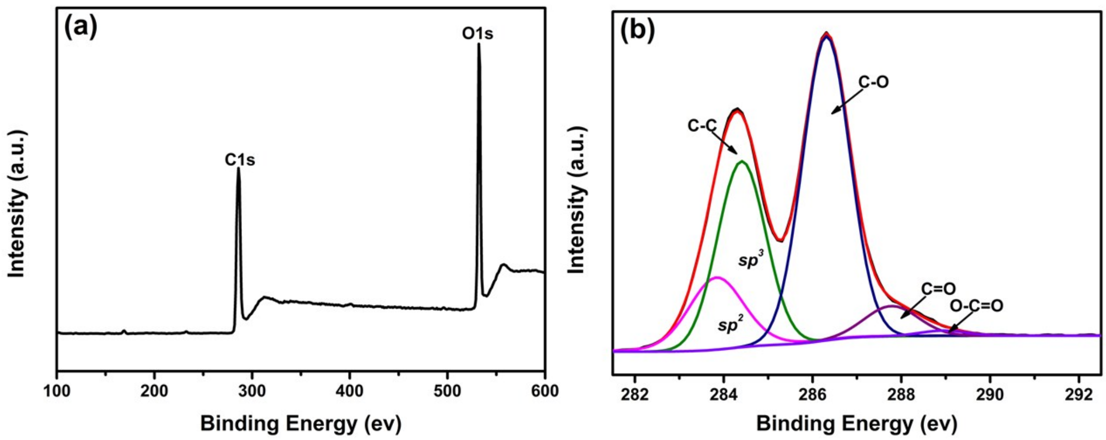

Fig. S1 Full XPS (a) and C 1s spectra (b) of TGO

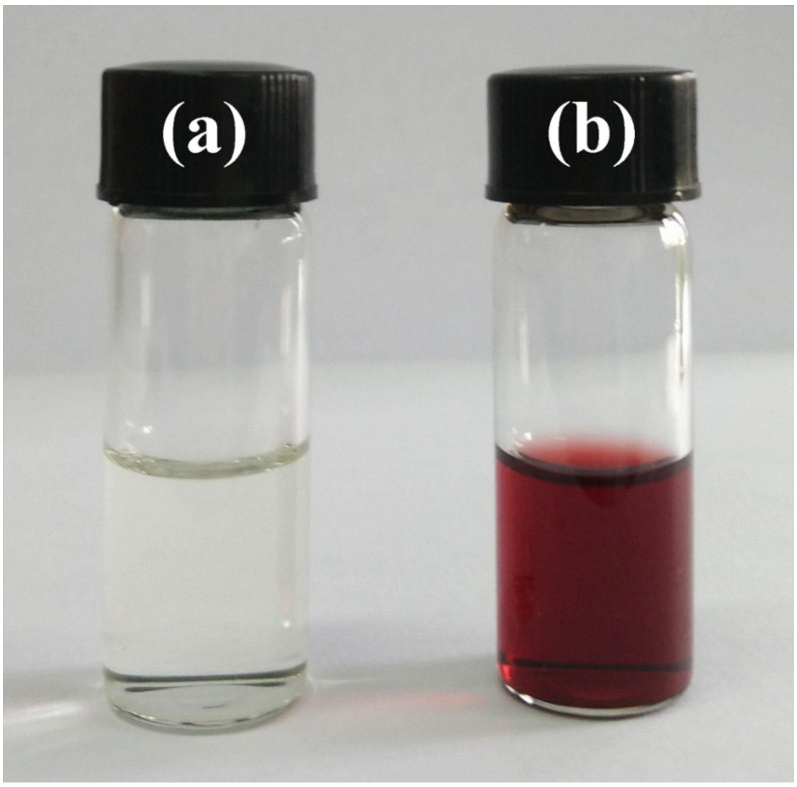

Fig. S2 Photographs of (a) rhodanine and (b) polyrhodanine dispersions in ethanol

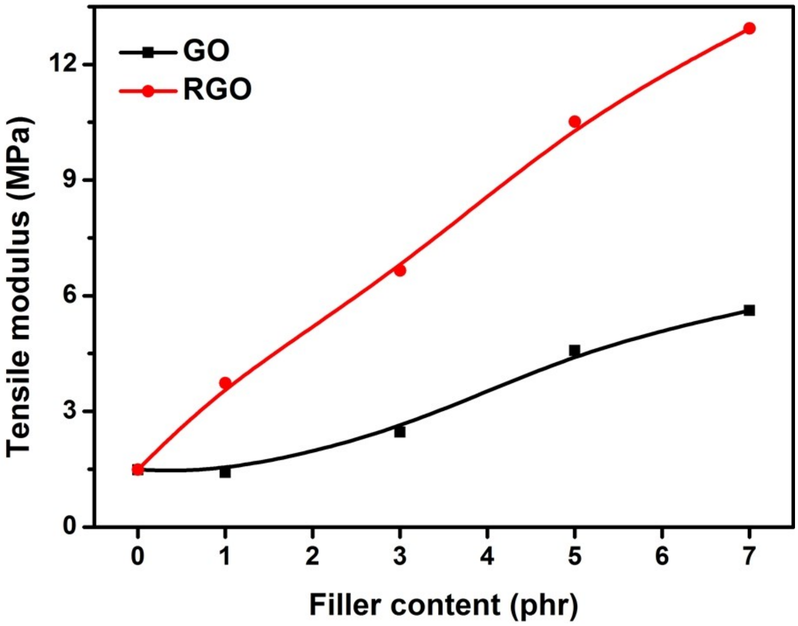

Fig. S3 Tensile modulus (at 200% strain) of SBR/GO and SBR/RGO composites.

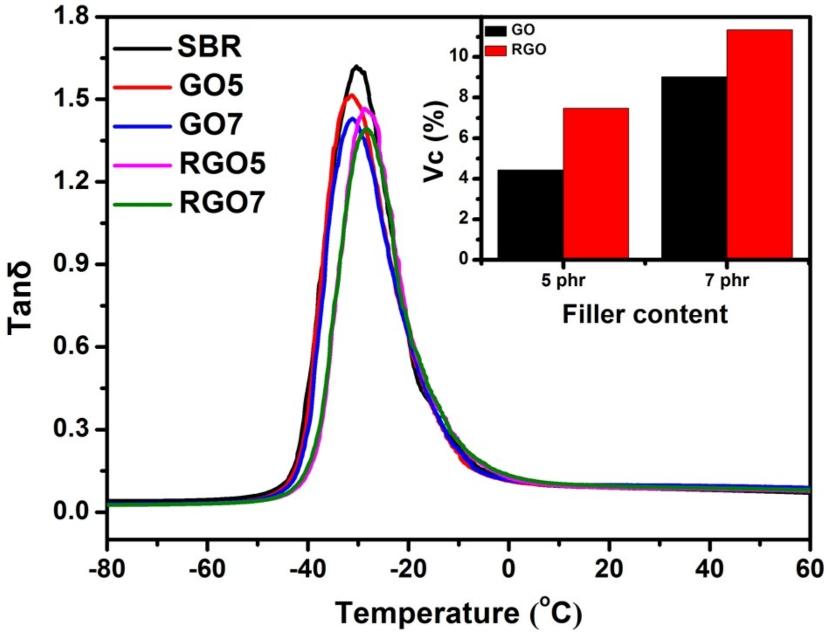

Fig. S4 tan δ of SBR/GO and SBR/RGO composites as a function of temperature. The inset are the volume fraction of constrained polymer in SBR composites.

Dynamic mechanical analysis was used to further evaluate the interfacial interactions between the filler and rubber. The concept of "constrained polymer" may be employed to evaluate the interfacial interaction [1]. It was said that some polymer chains would adsorbed on the surface of filler, which acted like glassy-like polymer. These polymer chains through entanglement with each other further improved the dynamic mechanical of composites. An equation was used to measure the fraction of constrained polymer.

$$V_C = 1 - \frac{H}{H_0(1-\Phi)}$$

Where Φ is volume fraction of filler, H and H_0 are the height of the tan δ peak of the filled and unfilled polymer, respectively.

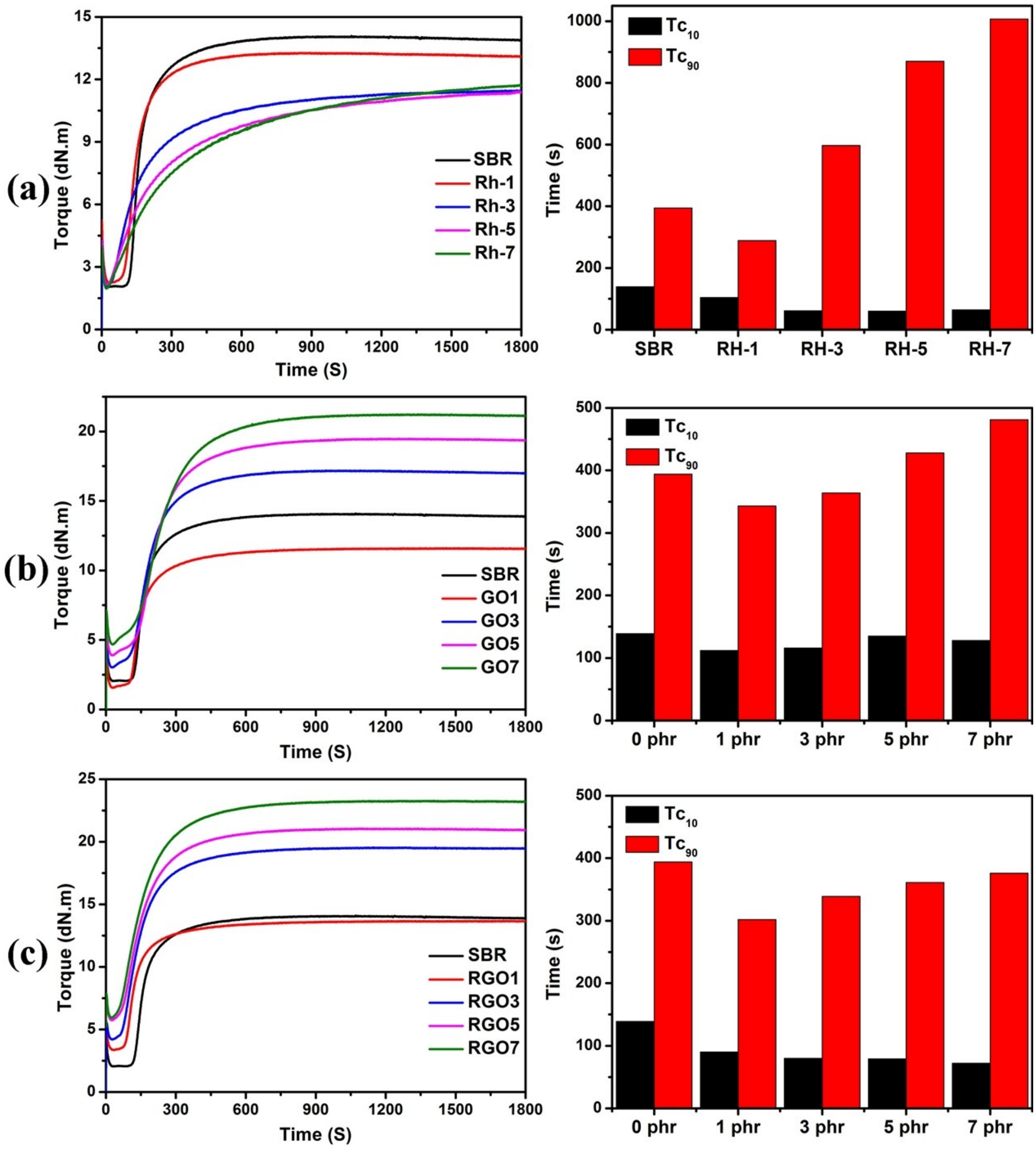

Fig. S5 Vulcanization curves and curing data for (a) SBR/rhodanine, (b) SBR/GO and (c) SBR/RGO compounds

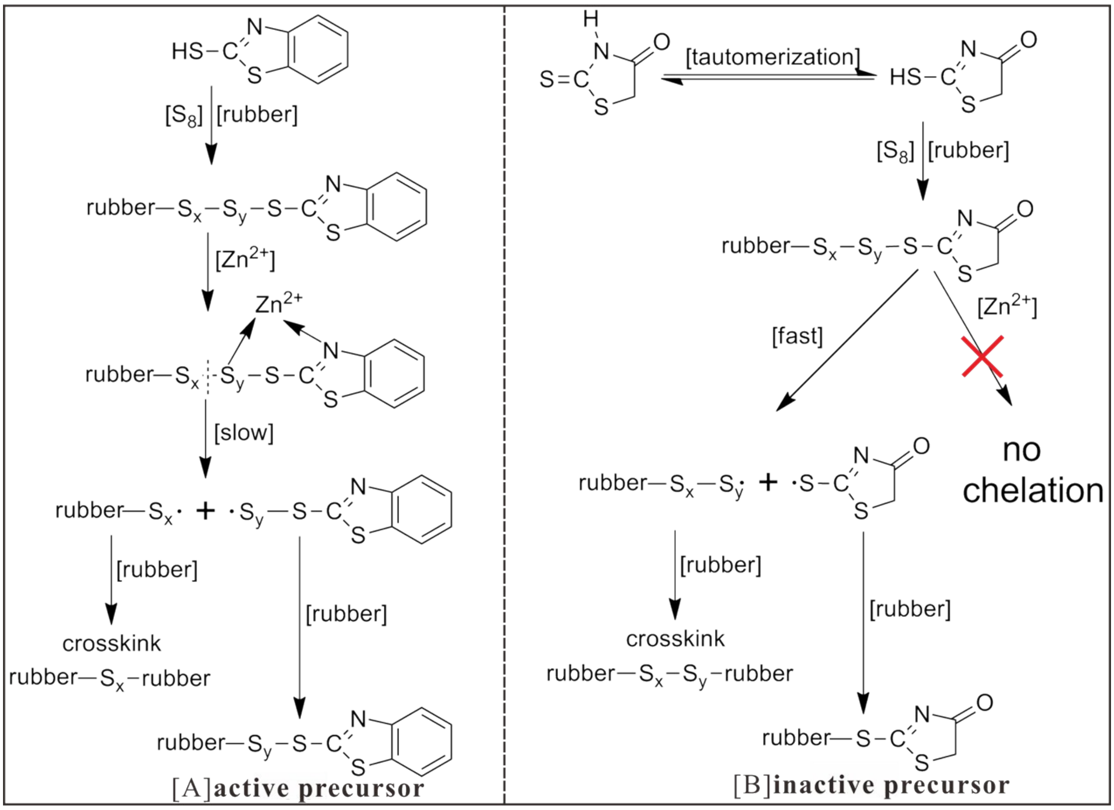

Fig. S6 Comparison of the potential accelerating mechanism between MBT and rhodanine[2]

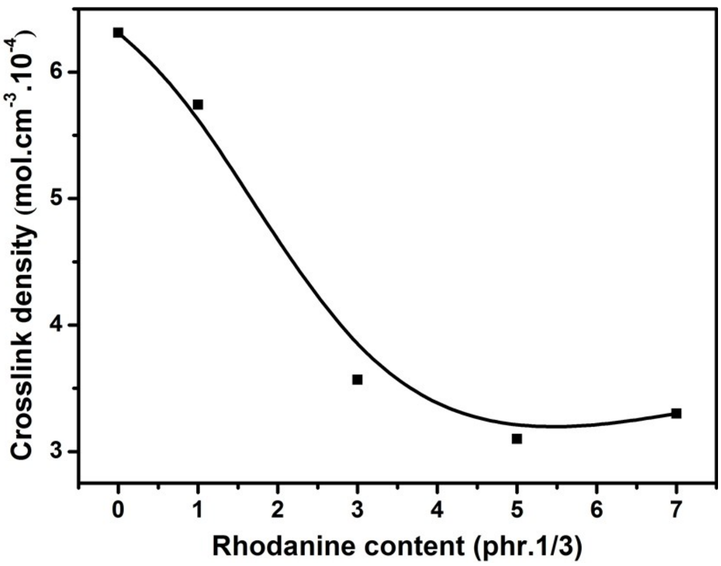

Fig. S7 Crosslink density for SBR/Rhodanine compounds with different rhodanine content.

References

1 J. Yang and C.-R. Han, *J. Phys. Chem. C*, 2013, **117**, 20236.

2 J. E. Mark, B. Erman and M. Roland, *The science and technology of rubber*, Academic press, 2013.