# Supporting Information

## Anomalous nano-barrier effects of the ultrathin molybdenum disulfide nanosheets assisted for improving flame retardance of polymer nanocomposites

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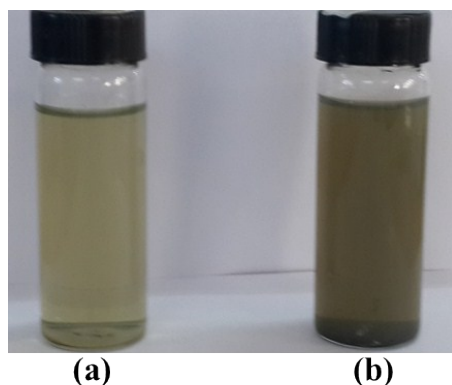*Tel./Fax: +86-551-63606463. E-mail: wangj@ustc.edu.cn. (Jian Wang)

**Fig. S1** Photographs of the CS-MoS$_2$ supernatant obtained by centrifugation at 8000 (a) and 3000 (b) rpm after three weeks, respectively.

Fig. S1b shows the dark brown CS-MoS$_2$ supernatant obtained after centrifugation at 3000 rpm. The stable dispersion with no precipitation after storage for three weeks indicates chitosan molecules could stable exfoliated MoS$_2$ nanosheets in aqueous solution. When the CS-MoS$_2$ supernatant were centrifuged at 8000 rpm again, it turned bright brown, suggesting the successful centrifugation of exfoliated MoS$_2$ nanosheets. The exfoliation of MoS$_2$ can be explained by the effect of acoustic cavitation of high frequency ultrasound in the formation, growth and collapse of microbubbles in solution, which induces shock waves on the surface of the bulk material, causing exfoliation.[1,2]
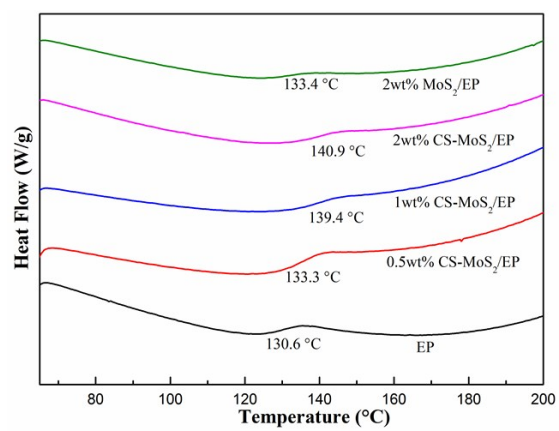
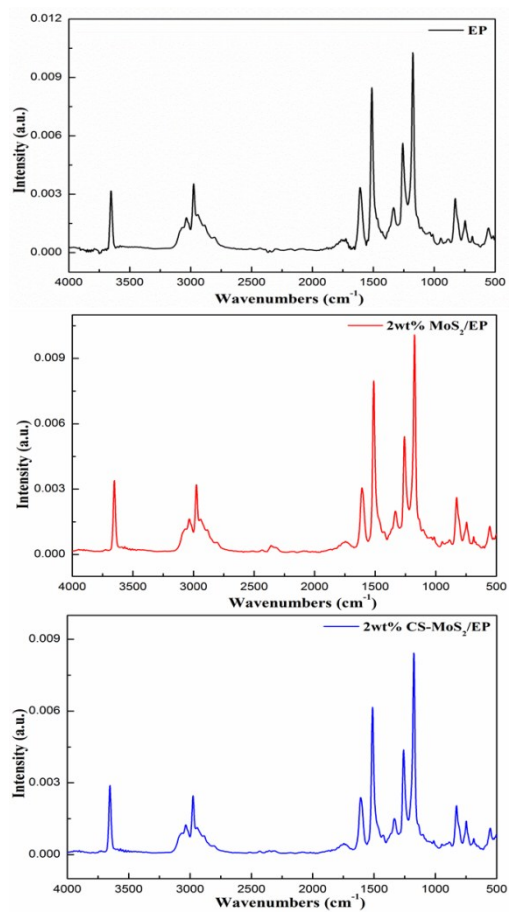**Fig. S2** DSC 2st heating curves of neat EP and its nanocomposites.

**Fig. S3** FT-IR spectra of pyrolysis products for neat EP, 2 wt% CS-MoS$_2$/EP and MoS$_2$/EP nanocomposites.

EP        0.5wt% CS-MoS$_2$/EP 1wt% CS-MoS$_2$/EP   2wt% CS-MoS$_2$/EP   2wt% MoS$_2$/EP
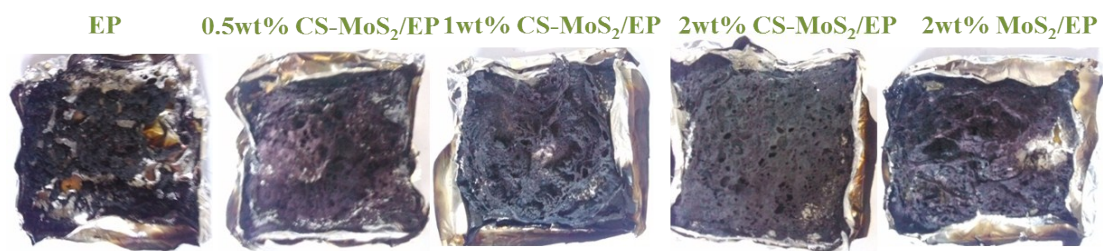


**Fig. S4** Digital photos of char residues for EP and its composites after cone tests.

# References

1. S. Vadukumpully, J. Paul and S. Valiyaveettil, Cationic surfactant mediated exfoliation of graphite into graphene flakes. *Carbon*. **2009**, *47*, 3288-3294.

2. X. M. Feng, X. Wang, W. Y. Xing, K. Q. Zhou, L. Song and Y. Hu, Liquid-exfoliated MoS2 by chitosan and enhanced mechanical and thermal properties of chitosan/MoS2 composites. *Compos. Sci. Technol.* **2014**, *93*, 76-82.