

**Electronic supplementary information**

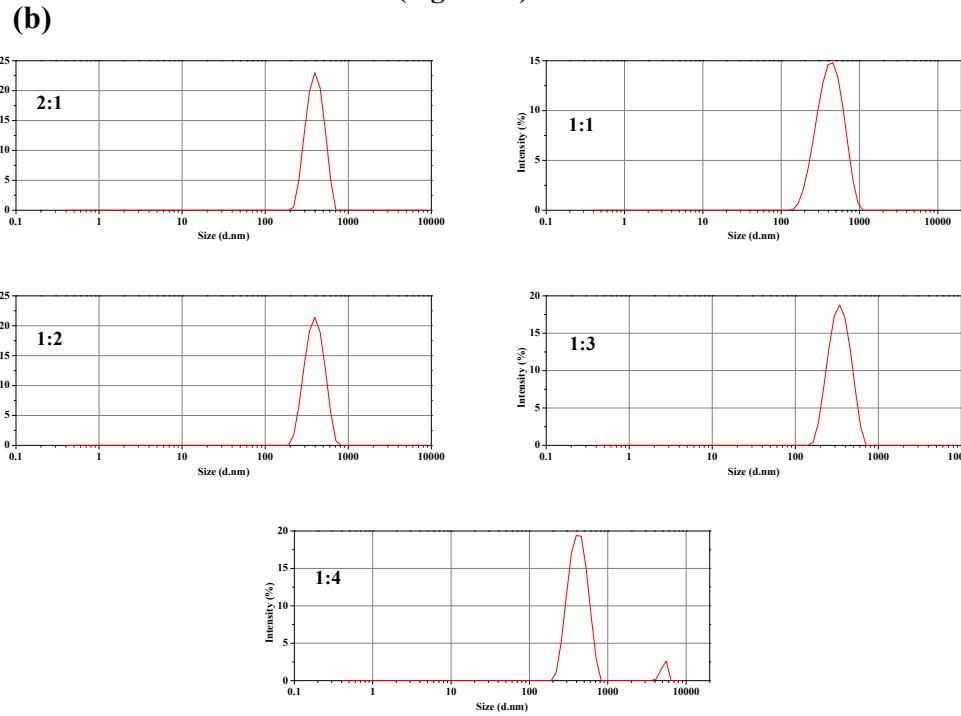
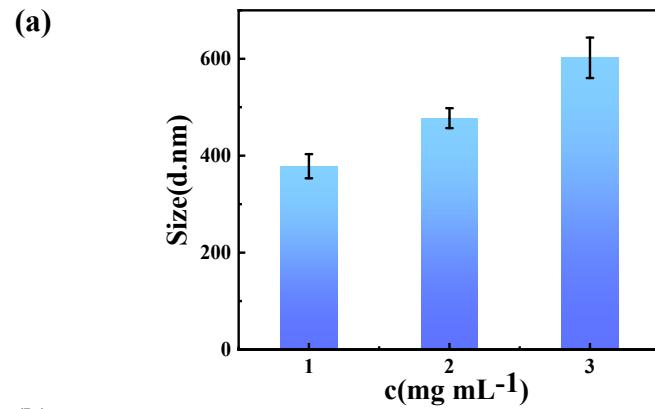
**Reactive and decomposable dispersant for maximizing the property of graphene composite**

Junshuo Cui\*, Xuening Du, Shiyi Liu, Liangyu Guo, Wanqi Liu, Ying Xiong\*

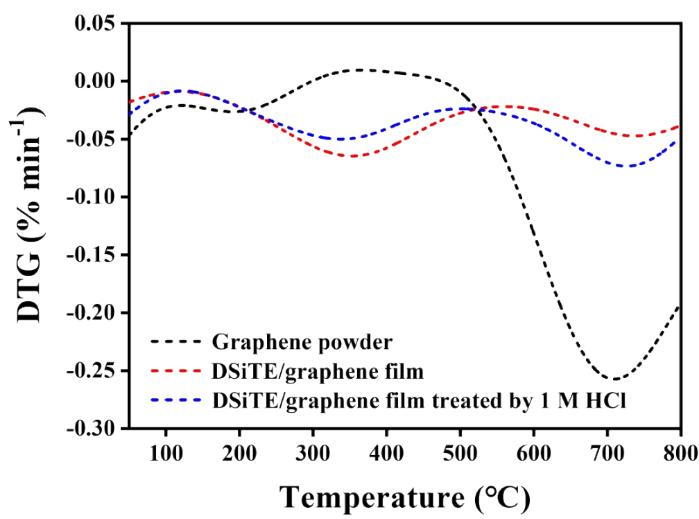
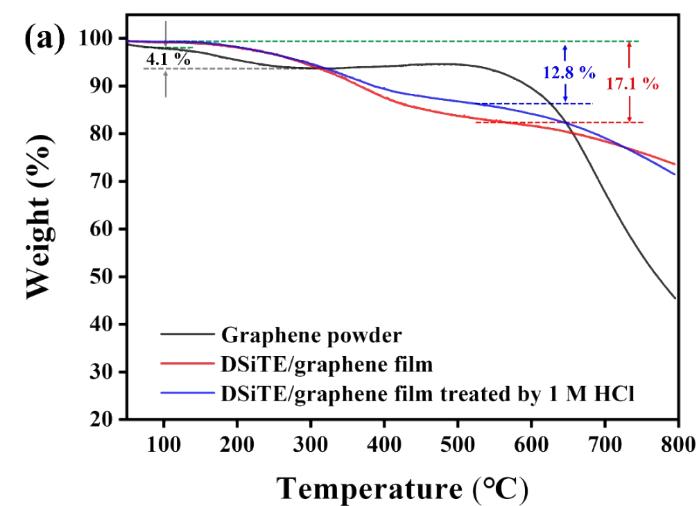
*College of Chemistry, Key Laboratory of Rare-scattered Elements of Liaoning Province, Liaoning University, No.66, Chongshan Middle Road, Huanggu District, Shenyang 110036, P. R. China.*

*E-mail: cuijsh@lnu.edu.cn; xiongying\_1977@hotmail.com*

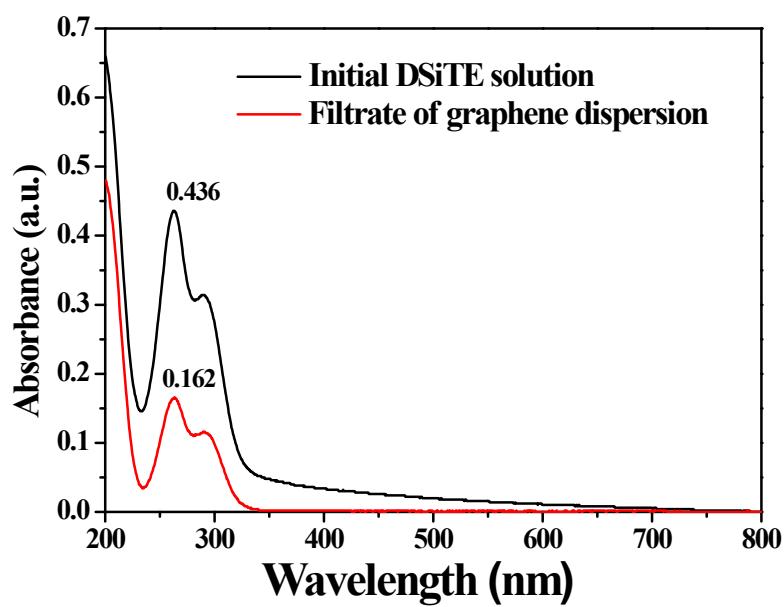
*Telephone: +86-024-62202380*



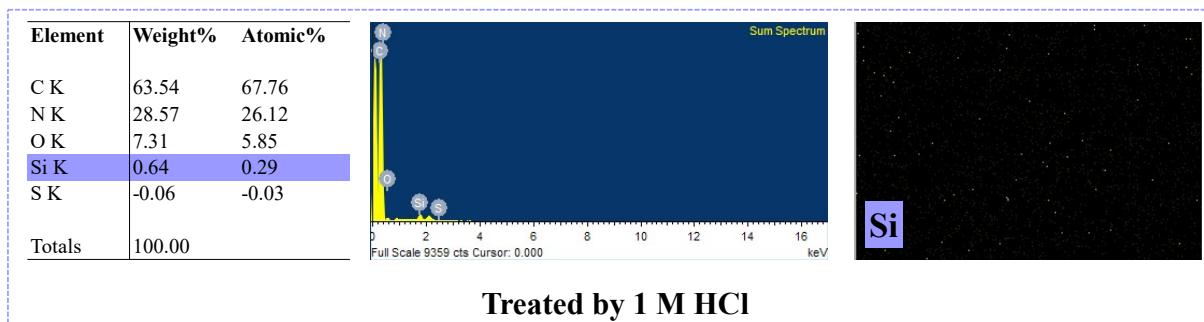
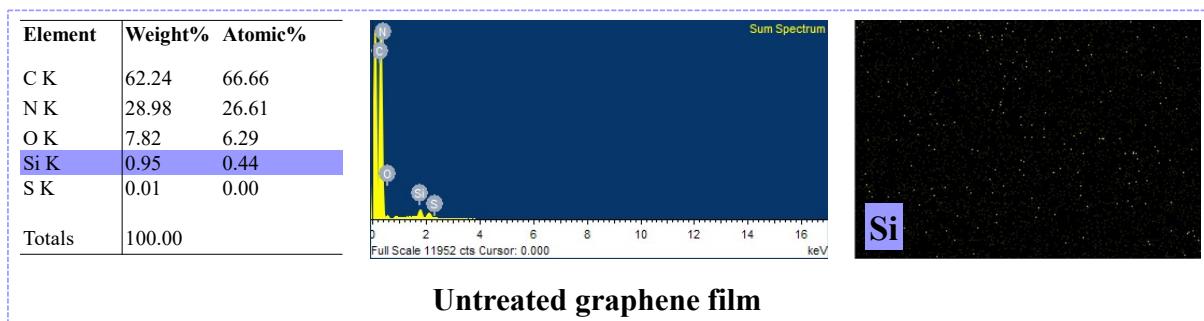
**Fig. S1** (a) Average particle size of the 1, 2 and 3 mg mL<sup>-1</sup> graphene dispersions in the presence of DSiTE. (b) DLS measurement results of the graphene dispersions with different weight ratio of DSiTE to graphene (2:1, 1:1, 1:2, 1:3, 1:4). The concentration of graphene is 1 mg mL<sup>-1</sup> for all the samples.



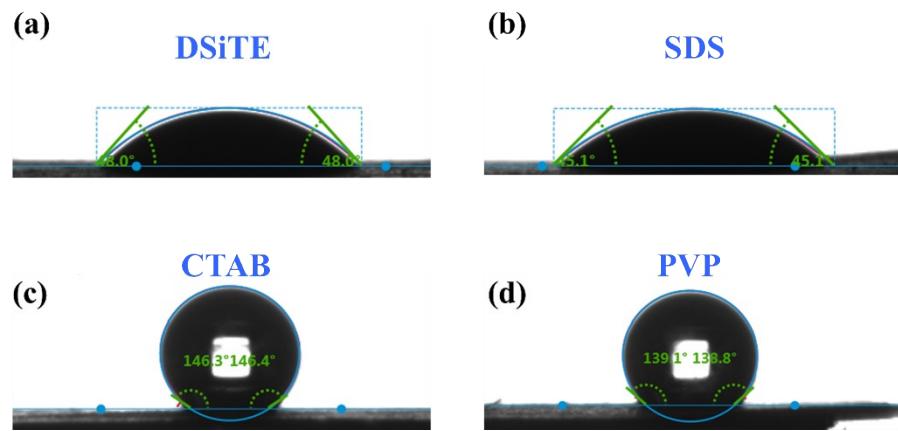
**Fig. S2** (a) TGA and (b) DTG curves of graphene, untreated graphene film, and graphene film that treated by 1 mol L<sup>-1</sup> HCl.



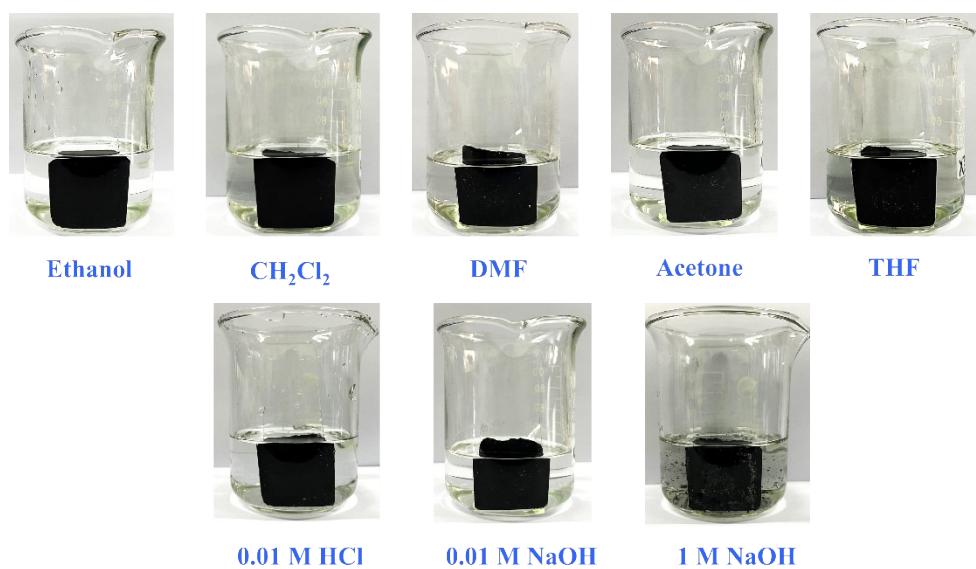
**Fig. S3** UV-vis absorption spectra of the DSiTE solution that directly used for dispersing graphene, and the corresponding filtrate of the prepared graphene dispersion. The initial weight ratio of DSiTE to graphene is 1:1.



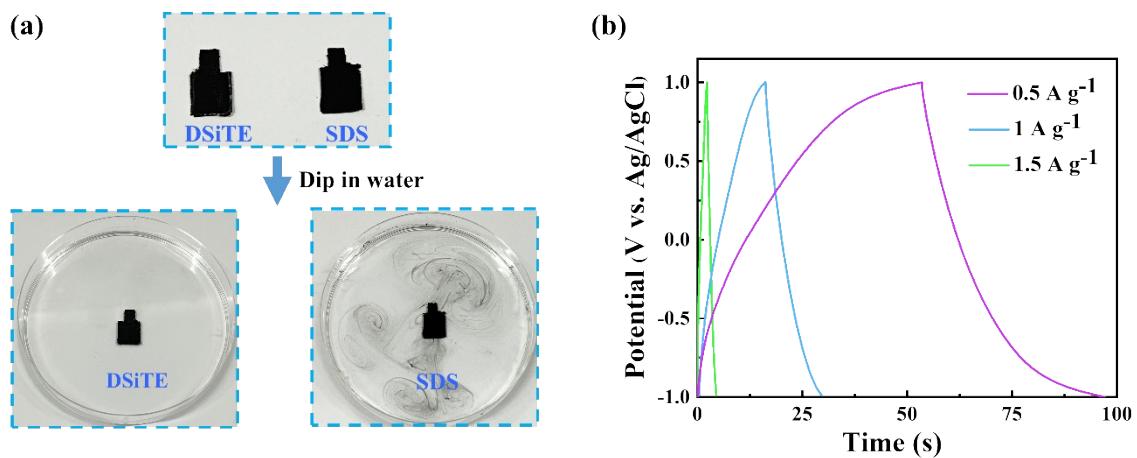
**Fig. S4** EDS characterization results of the graphene films untreated and treated by 1 mol L<sup>-1</sup> HCl. The elimination of DSiTE is calculated by the content change of Si atom.



**Fig. S5** Water contact angles of the (a) DSiTE/graphene, (b) CTAB/graphene, (c) PVP/graphene, and (d) SDS/graphene films.



**Fig. S6** DSiTE/graphene coatings immersed in ethanol, dichloromethane, DMF, acetone, THF,  $0.01 \text{ mol L}^{-1}$   $\text{HCl}$ ,  $0.01 \text{ mol L}^{-1}$   $\text{NaOH}$  and  $1 \text{ mol L}^{-1}$   $\text{NaOH}$  solutions for 24 hours, respectively.



**Fig. S7** (a) Graphene coated carbon cloth electrodes that prepared with the assistance of DSiTE and SDS, respectively, and their immersion in water. (b) GCD curves of the DSiTE/graphene/carbon cloth composite electrode.