

Supporting Information

Molecular-scale grinding of uniform small-size graphene flakes for use as lubricating oil additives

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The FTIR spectrum of SG after chemical treatment in the mixture of $\text{H}_2\text{SO}_4/\text{H}_2\text{O}_2$ was presented in Fig. S1 to illustrate the existence of $-\text{SO}_3\text{H}$. The peak at 1573 cm^{-1} is assigned to the stretching vibration of $\text{C}=\text{C}$ in basal plane of SG. And consistent with the literature, the three peaks at 1137 cm^{-1} , 1065 cm^{-1} and 832 cm^{-1} can confirm the presence of $-\text{SO}_3\text{H}$, a functional group which could be used for grafting T151 according to the former literature.

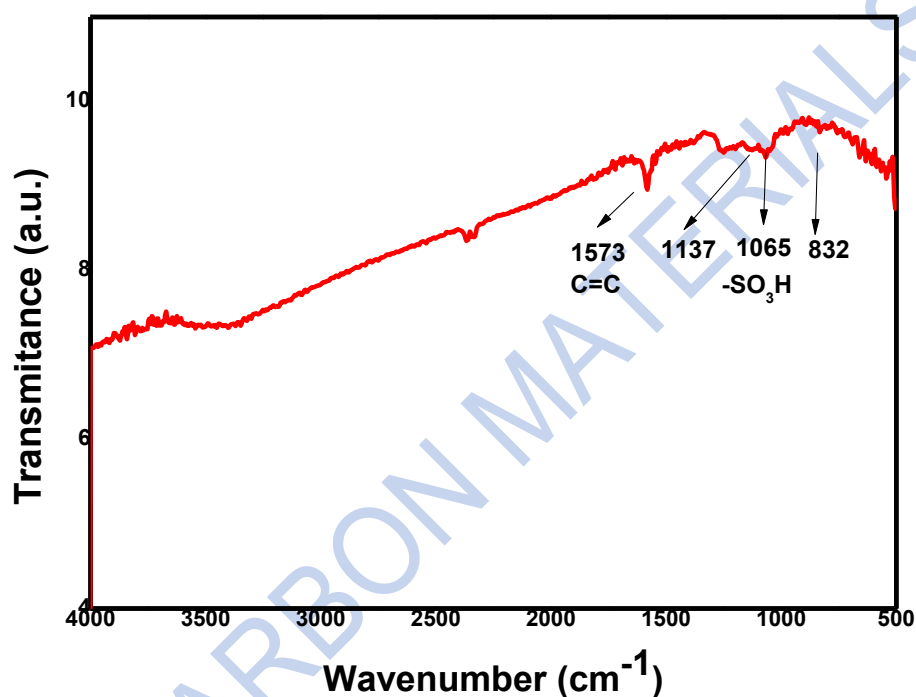


Figure S1 The FTIR spectrum of SG after chemical treatment in the mixture of $\text{H}_2\text{SO}_4/\text{H}_2\text{O}_2$

SEM results in Fig. S2 show that the degree of graphene exfoliation prepared in this work is affected by the mass ratio of $\text{Ca}(\text{OH})_2$ to graphite. Four different ratios of $\text{Ca}(\text{OH})_2$ to graphite, i.e. 4:1, 3:1, 1:1, and 1:2 were employed in our experiments. It can be seen that the exfoliation degree of graphene is similar when the ratio is 4:1 and 3:1, while the exfoliated graphene is thicker when the ratio is 1:1 and 1:2.

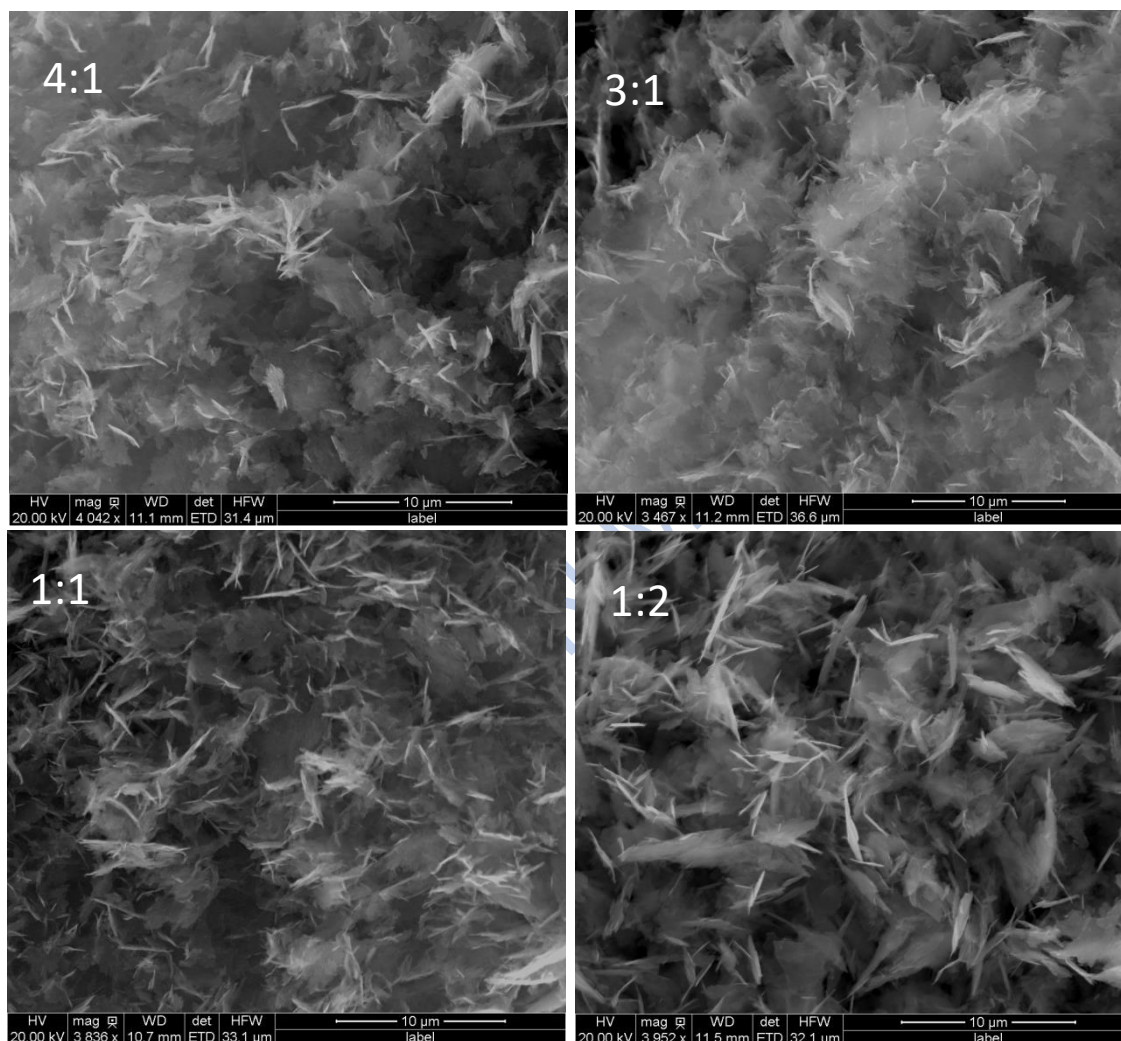


Figure S1 SEM images of graphene prepared with different ratio of $\text{Ca}(\text{OH})_2$ to graphite