

## Electronic Supplementary Information:

### Redox Chemistry between Graphene Oxide and Mercaptan

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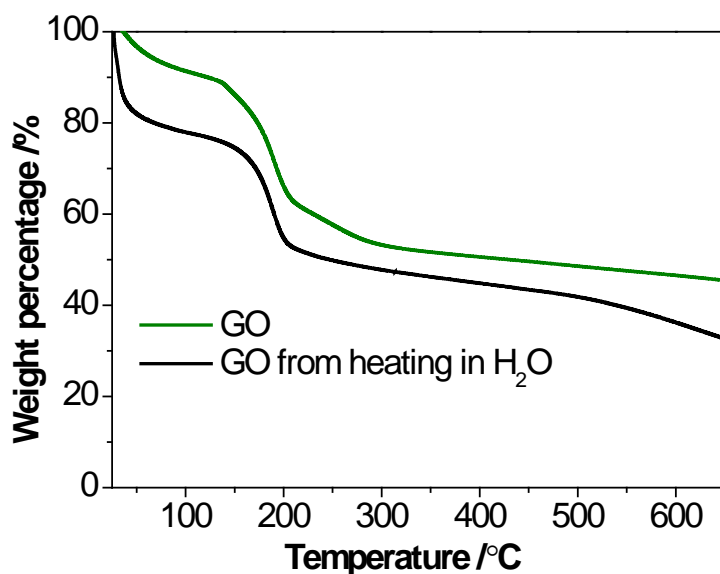
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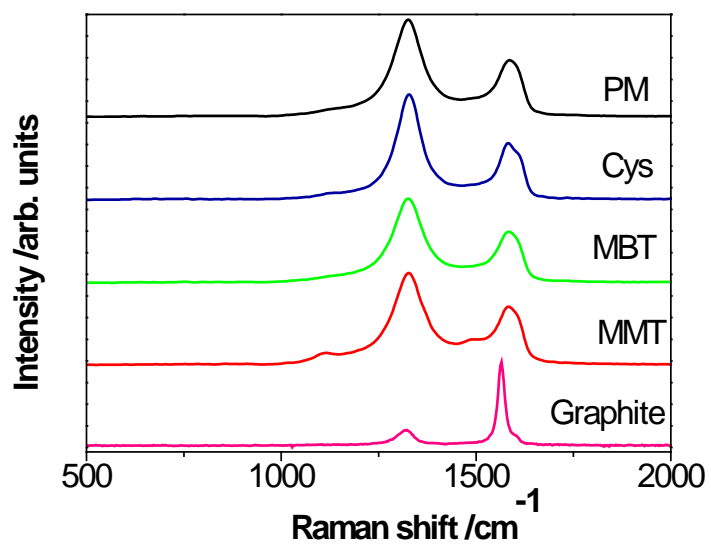
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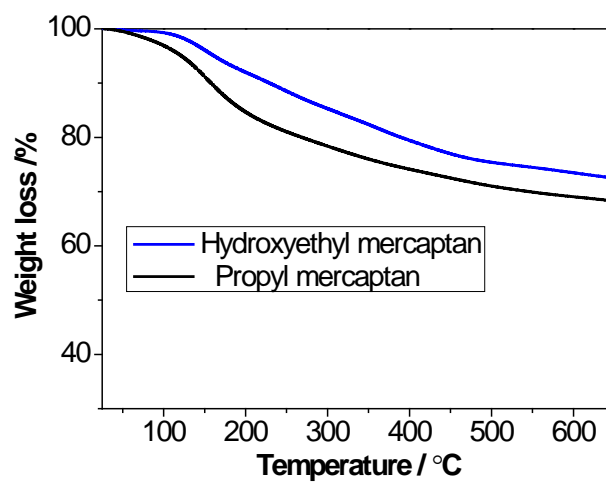
**Figure S1.** Photos of GO dispersion from control reaction at 80 °C in water in the absence of mercaptan. (A) Original reaction dispersion after heating for 660 min in water; (B) DMF-diluted GO dispersion at different reaction time.



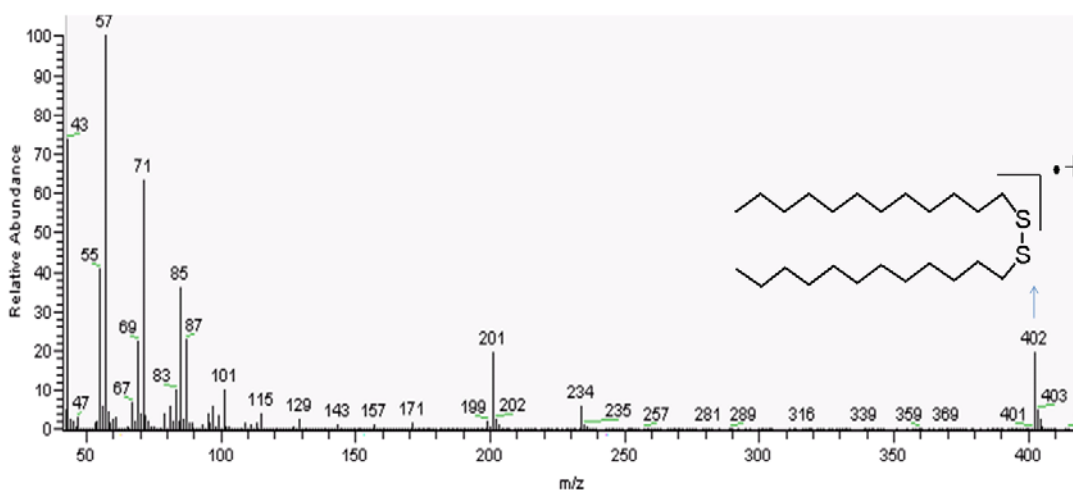
**Figure S2.** TGA curves of pristine GO and GO after heating in water at 80 °C for 660 min.



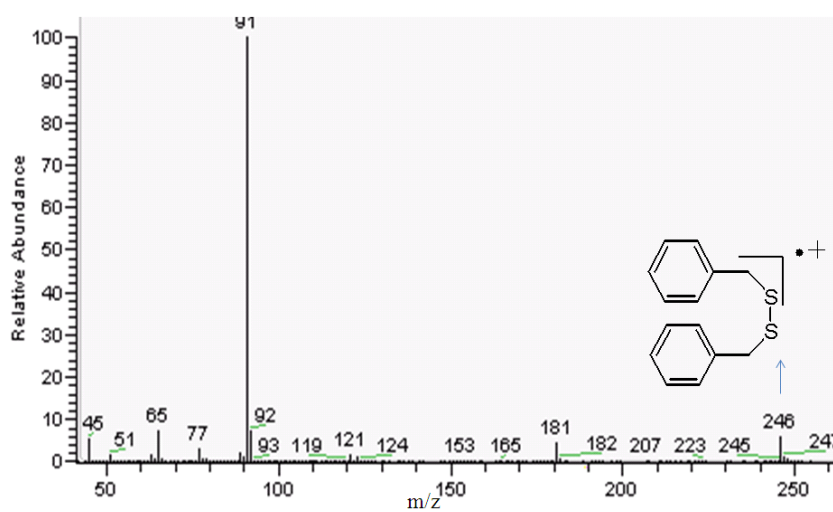
**Figure S3.** Raman spectra of graphite and RGO samples by different mercaptans.



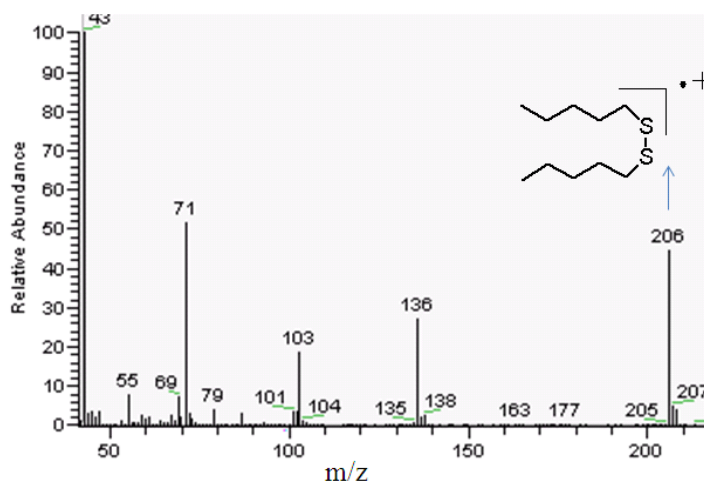
**Figure S4.** TGA plots of RGO samples reduced by hydroxyethyl mercaptan (HEM) and propyl mercaptan (PM).



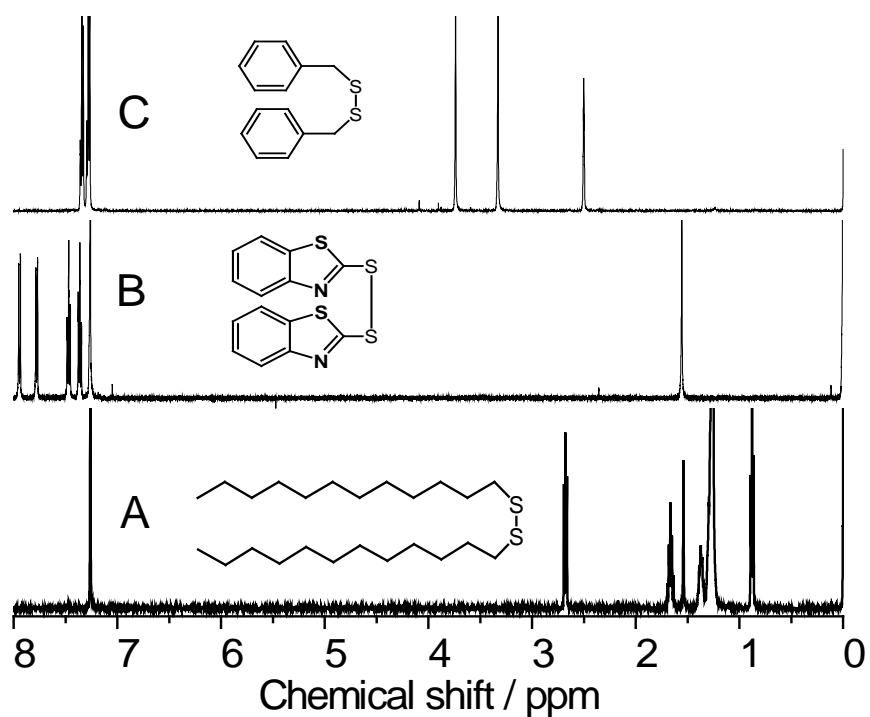
**Figure S5.** Mass spectrum of didodecyl disulfide detected by GC of the reaction mixture.



**Figure S6.** Mass spectrum of dibenzyl disulfide detected by GC of the reaction mixture.



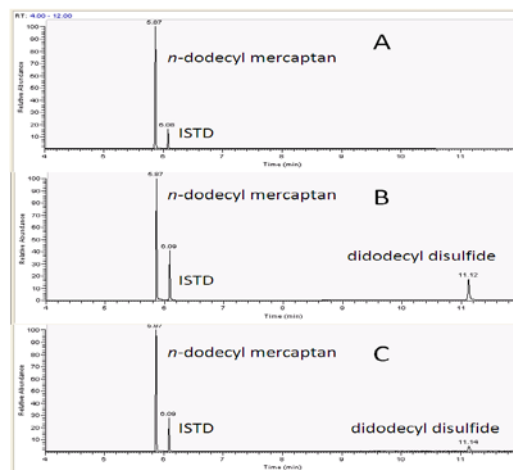
**Figure S7.** Mass spectrum (GC-MS) of dipentyl disulfide detected by GC of the reaction mixture.



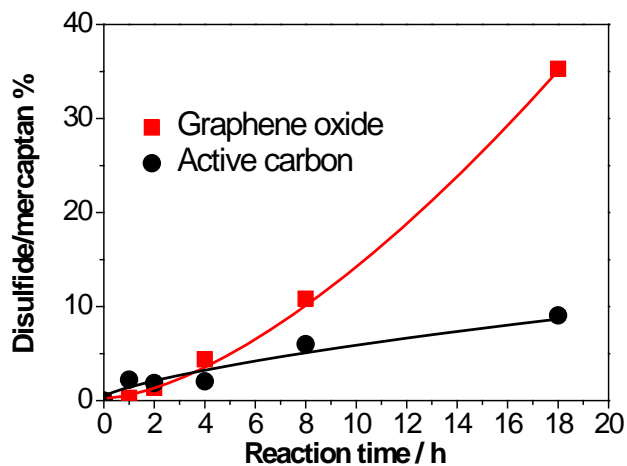
**Figure S8.**  $^1\text{H}$  NMR confirmed the structures of products of disulfides (A) didodecyl disulfide, (B) dibenzothiazole disulfide and (C) dibenzyl disulfide.



**Figure S9.** Photos of GO (A) and active carbon (B) in round flask. Photos of reaction mixture in round flask with GO (C) and active carbon (D) after deodorization.



**Figure S10.** GC diagrams of (A) *n*-dodecyl mercaptan solution in heptane, (B) reaction mixture after deodorization with GO and (C) reaction mixture after deodorization with active carbon.



**Figure S11.** Increase in the ratio of disulfides to mercaptans along with reaction time in heptane. The lines are drawn only for guidance.

**Table S1** Fitting results (at.%) of O1s XPS spectra of GO and RGO samples

Reaction time (min)	-OH	O-C	O=C	O-C(O)	Quinone
GO	9.5	14.5	2.9	2.2	1.2
120	5.1	9.1	3.1	3.0	1.5
300	3.4	2.2	3.4	2.4	1.1
660	3.3	1.2	2.1	1.4	1.2