

## Supplementary Materials

# Thermal and Mechanical Interfacial Behaviors of Graphene Oxide-Reinforced Epoxy Composites Cured by Thermal Latent Catalyst

Shahina Riaz and Soo-Jin Park \*

Department of Chemistry, Inha University, Incheon 402-751, South Korea; shahinaawan519@gmail.com

\* Correspondence: sjpark@inha.ac.kr

Received: 1 April 2019; Accepted: 24 April 2019; Published: 25 April 2019

**Table S1.** Analysis of the deconvoluted C1s peaks obtained from XPS and the FWHM of the different C1s peaks as well as the relative area percentages for GO and HMTA-GO.

Samples	Cs1 fitting			
	Binding energy, (eV)	Relative area %,	FWHM (eV)	
	C-C	C-O	C=O	C-N
GO	284.6, 43.1, 1.40	286.6, 50.03, 1.40	288.6, 20.32, 1.40	-
HMTA-GO	284.4, 60.25, 1.40	286.6, 11.25, 1.40	288.5, 8.23, 1.40	285.4, 7.01, 1.40

FWHM= Full width half maximum.

**Table S2.** Atomic percentage of C, O and N for GO and HMTA-GO.

samples	C1s %	O1s %	N1s %
GO	59.75	40.25	-
HMTA-GO	71.61	24.6	3.78

**Table S3.** Elemental composition of N-PBH.

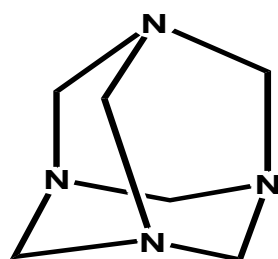
Weight %		
C contents <sup>a</sup>	H contents <sup>b</sup>	N contents <sup>c</sup>
31.99	2.93	6.89

<sup>a</sup>Carbon contents, <sup>b</sup>Hydrogen contents, <sup>c</sup>Nitrogen contents; determined by elemental analysis.

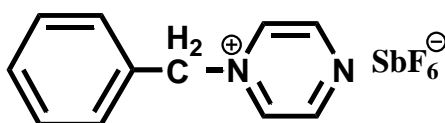
**Table S4.** Exothermic peak temperatures of epoxy composites obtained by DSC.

Sample	T <sub>i</sub>	T <sub>p</sub>
Neat Epoxy	159	191
GO 0.04	157	197
GO 0.2	155	202
HMTA-GO 0.04	152	188
HMTA-GO0.2	156	187

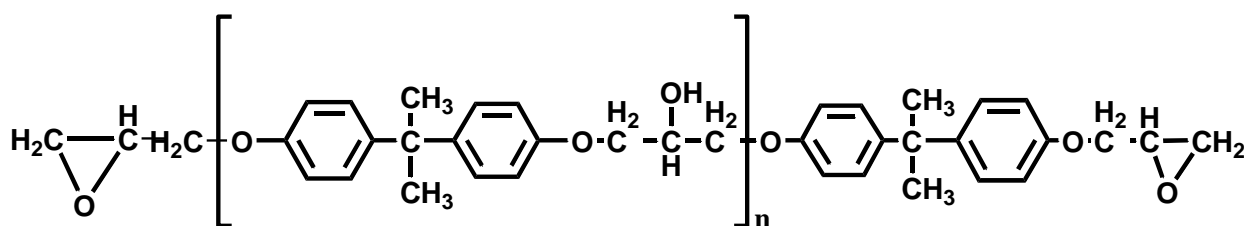
T<sub>i</sub>= Initial temperature, T<sub>p</sub>= Peak temperature.



structure of HMTA



Chemical structure of N-BPH



Chemical structure of DGEBA

**Figure S1.** Chemical structure of HMTA, N-BPH and DGEBA.

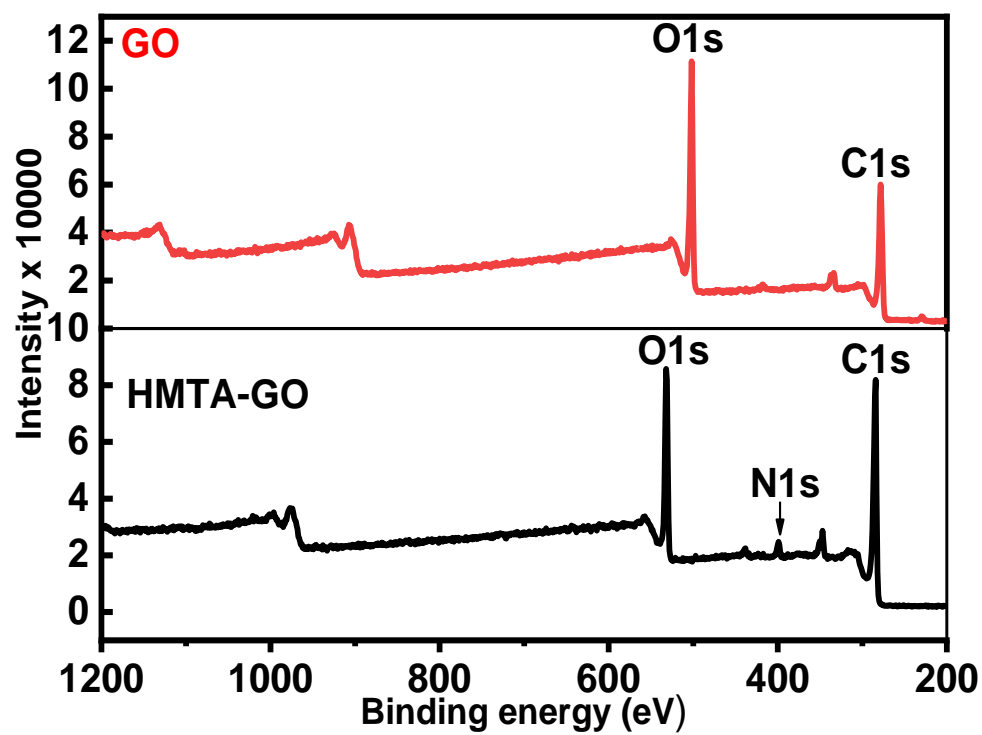


Figure S2. XPS survey scan of GO and HMTA-GO.

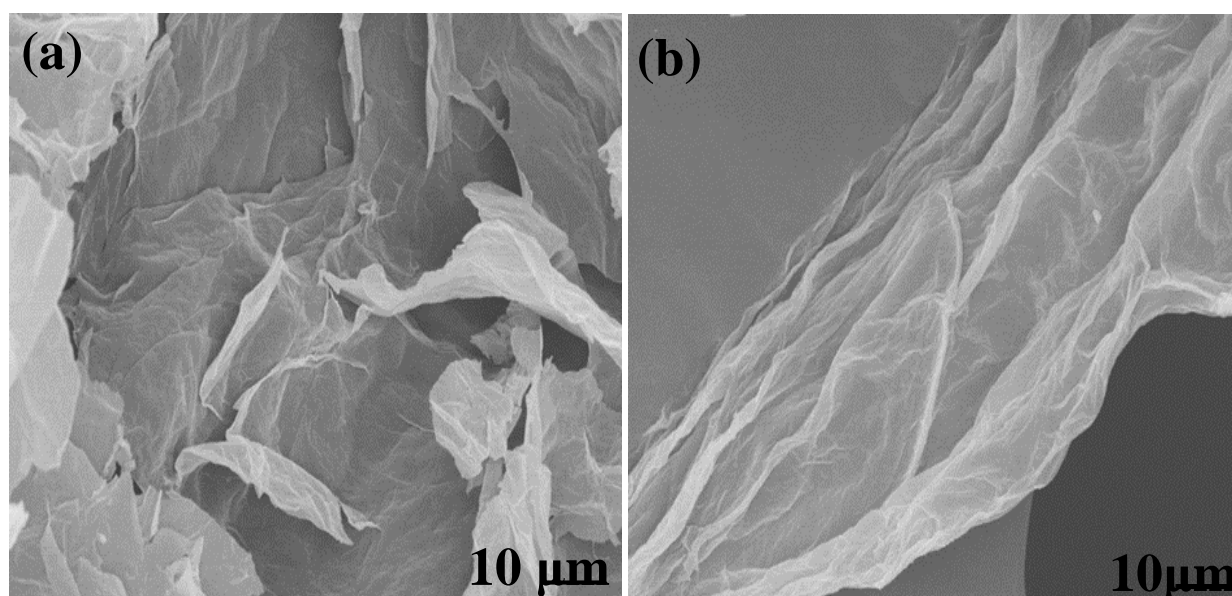
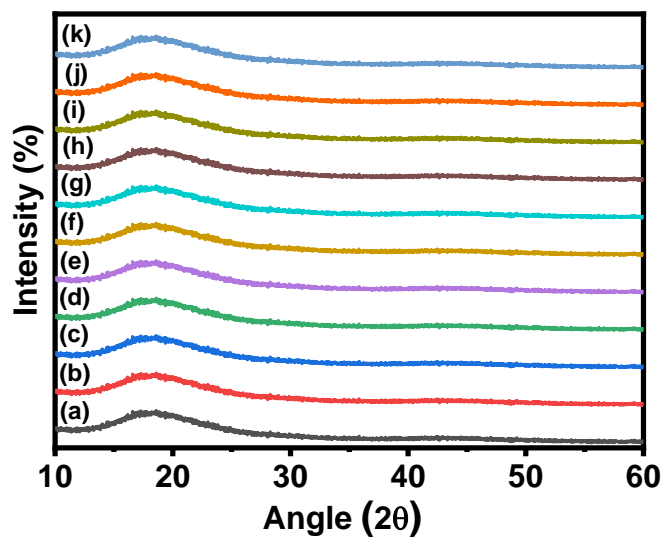
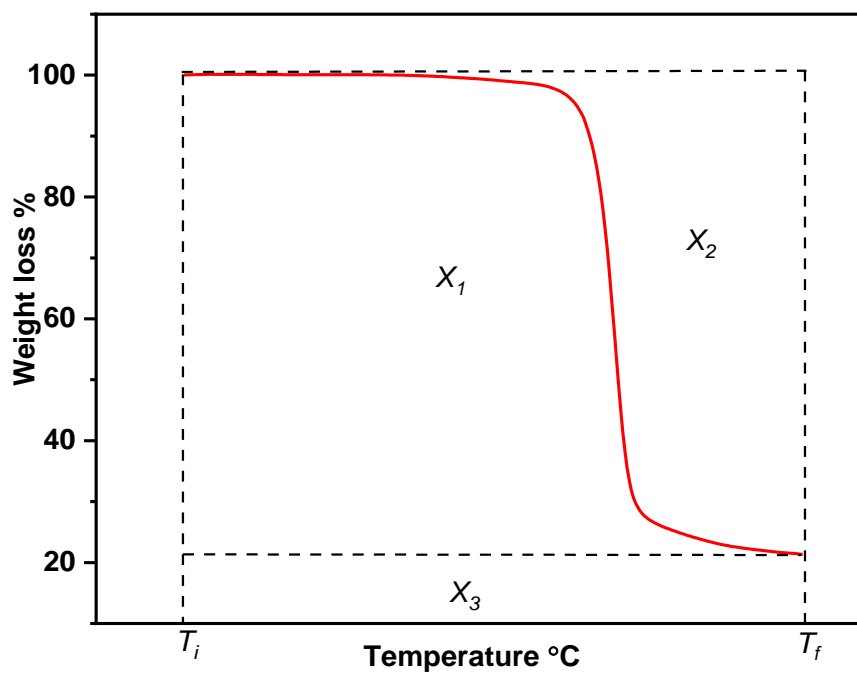


Figure S3. HR-SEM images of (a) GO and (b) HMTA-GO.



**Figure S4.** XRD spectrum of (a) Neat epoxy (b) GO 0.04 (c) GO 0.06 (d) GO 0.08 (e) GO 0.1 (f) GO 0.2 (g)HMTA-GO 0.04 (h) HMTA-GO 0.06 (i) HMTA-GO 0.08 (j) HMTA-GO 0.1 (k) HMTA-GO 0.2.



**Figure S5.** Schematic illustration for calculation of  $A^*$  and  $K^*$ .

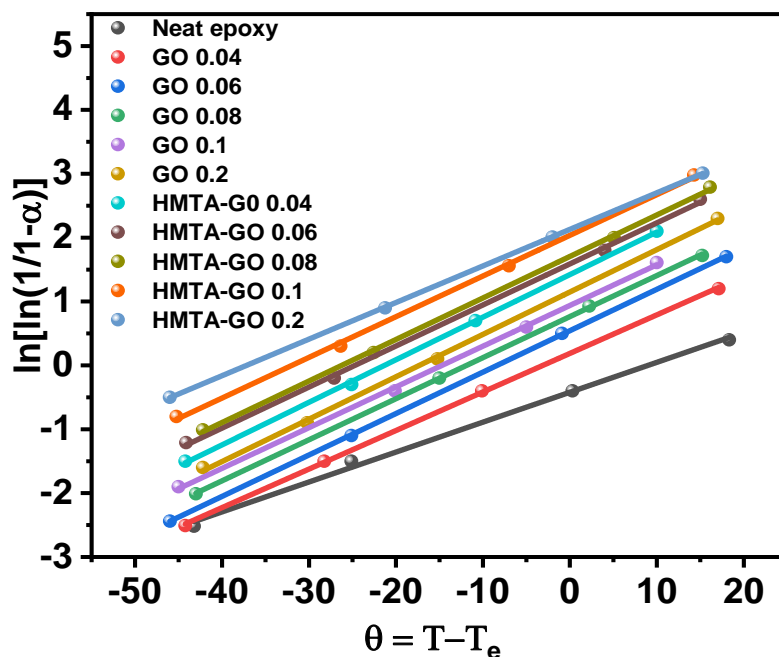


Figure S6. Plot of  $\ln[\ln(1/1-\alpha)]$  versus  $\theta$ .

#### Cure behavior of epoxy composites

DSC analysis was carried out to determine the cure behavior of epoxy composites. Figure S6 shows the DSC curves for GO epoxy and HMTA-GO epoxy composites. Table S4 shows the initial curing temperature ( $T_i$ ) and peak temperature ( $T_p$ ) for epoxy composites. The exothermic cure reaction occurs between 120–209 °C. These curves exhibit a decrease in exothermic peak height of composites containing GO and HMTA-GO compared to neat epoxy, indicating an enhancement in the degree of interaction as well as physical hindrance. The composites containing HMTA-GO exhibit a shift of the exothermic peak to a lower temperature, indicating an increase in the curing rate for the nanocomposites [1].

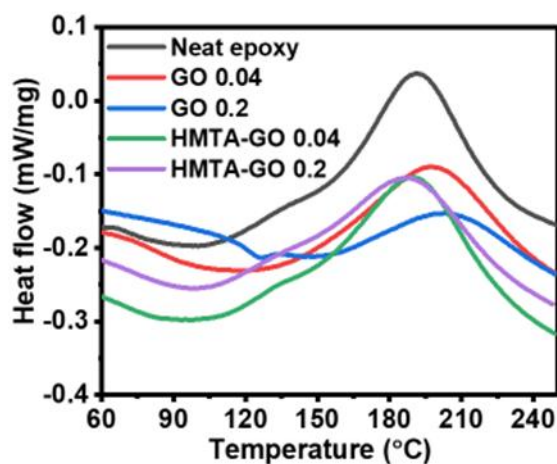


Figure S7. DSC curves for epoxy composites.

## Reference

1. Xu, J.; Yang, J.; Liu, X.; Wang, H.; Zhang, J.; Fu, S. Preparation and characterization of fast-curing powder epoxy adhesive at middle temperature. *Royal Society open science* **2018**, *5*, 180566.



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