Supporting Information

Lightweight and flexible reduced graphene oxide/ water-borne polyurethane composites with high electrical conductivity and excellent electromagnetic interference shielding performance

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Contents:

Zeta potential characterization

The zeta potential characterization were performed at room temperature using a Malvern Zetasizer Nano-ZS system with irradiation from a 632.8 nm He-Ne laser. The samples were filled in folded capillary cells, and the electrophoretic mobility was measured using a combination of electrophoresis and laser Doppler velocimetry techniques. Herein, the Smoluchowski approximation[1] was used for the measurement of zeta potential. The Smoluchowski approximation for plate-like materials[2] is shown as $\zeta = \eta\mu/\varepsilon$, where ζ is the zeta potential, η is the solution viscousity, μ is the electrophoretic mobility and ε is the permittivity of the solution. The approximation for zeta potential measurement of graphene-based material was conducted by the previous studies[3-4]. As a result, this Smoluchowski approximation was widely used by several groups for the zeta potential analysis of graphene-based materials[5-8].

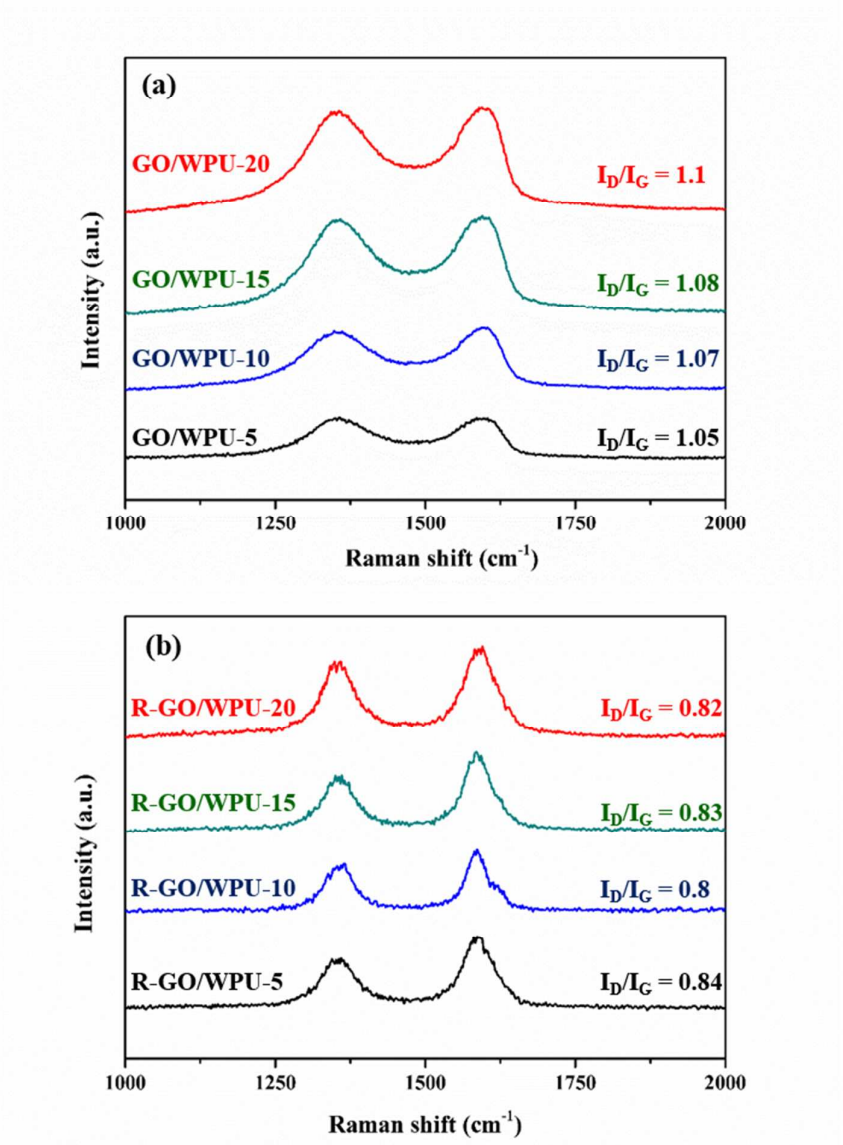

Figure S1 The Raman spectra of GO/WPU and r-GO/WPU composites.

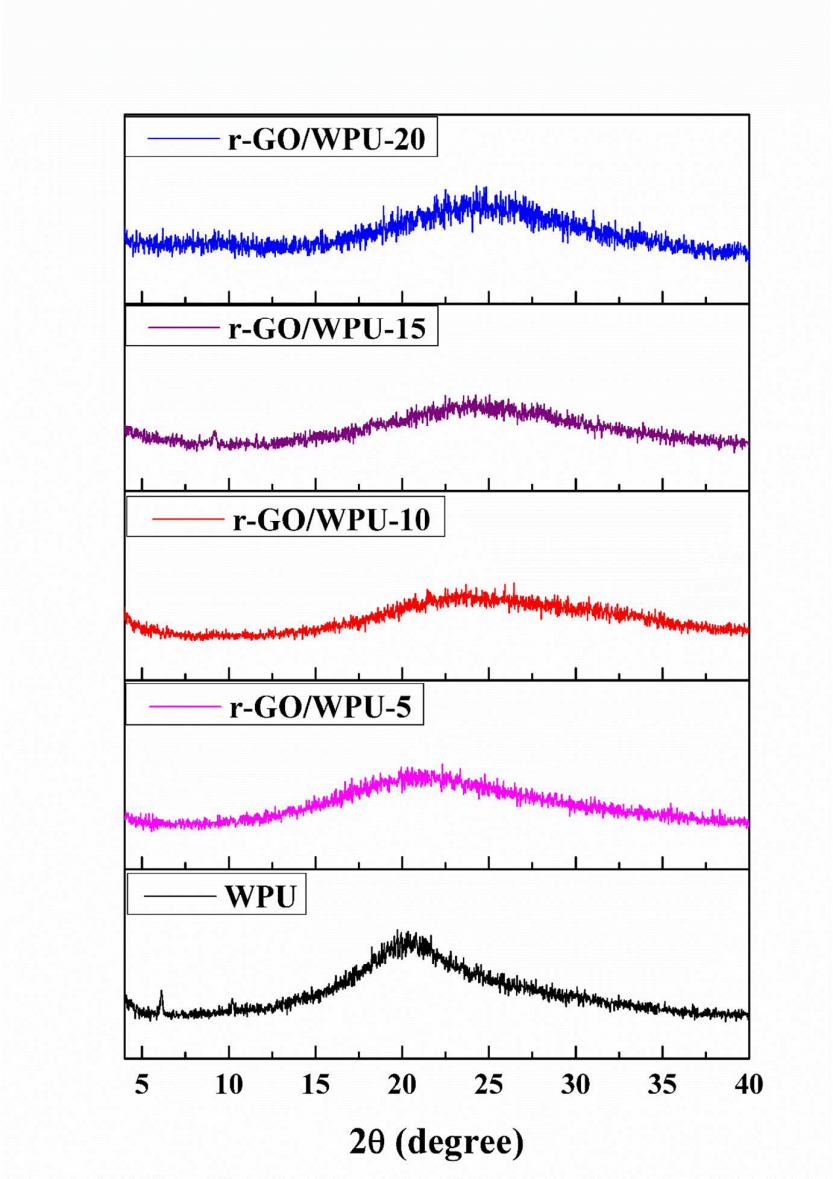

Figure S2 The XRD results of WPU and r-GO/WPU composites.

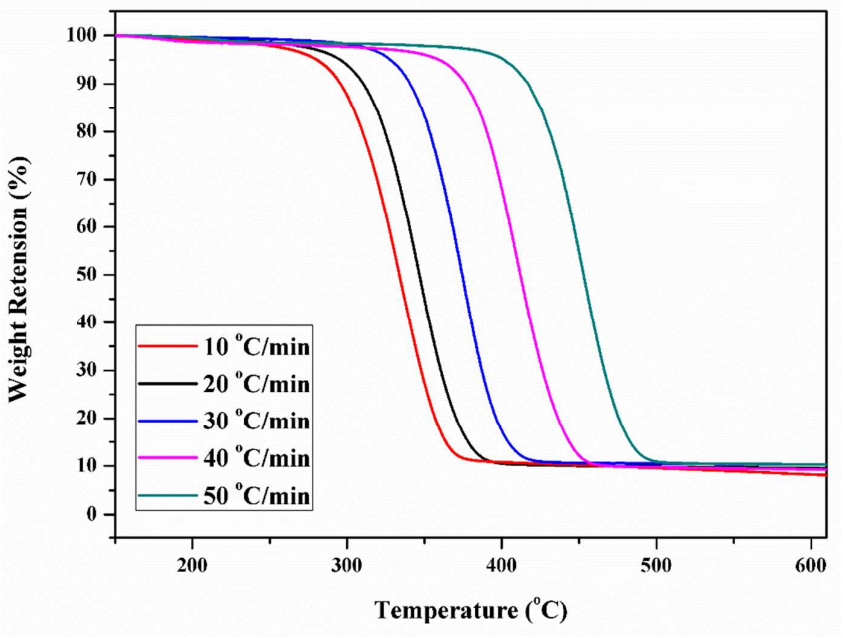

Figure S3 The TGA analysis of r-GO/WPU15 composites under N_2 gas flow with various ramping rate

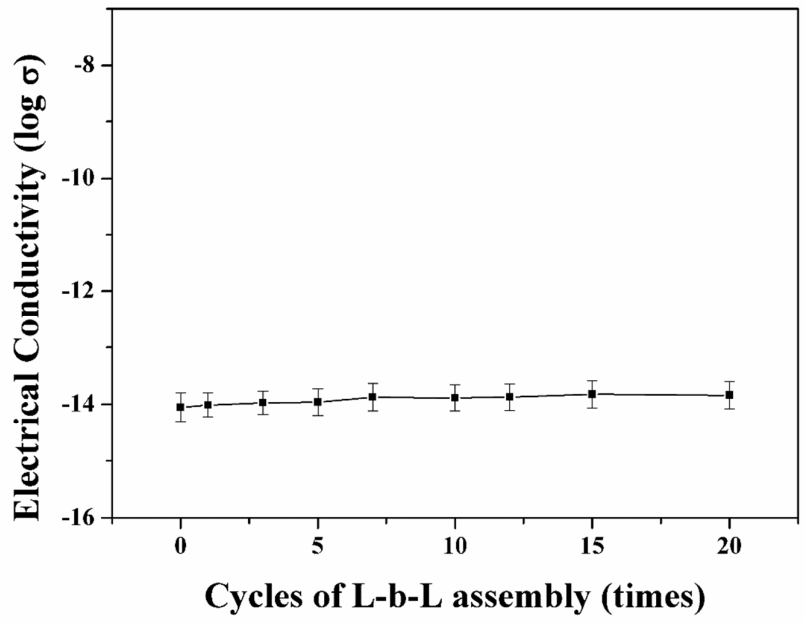

Figure S4 The electrical conductivity (σ) of GO/WPU composites measured at room temperature as a function of cycles of L-b-L assembly.

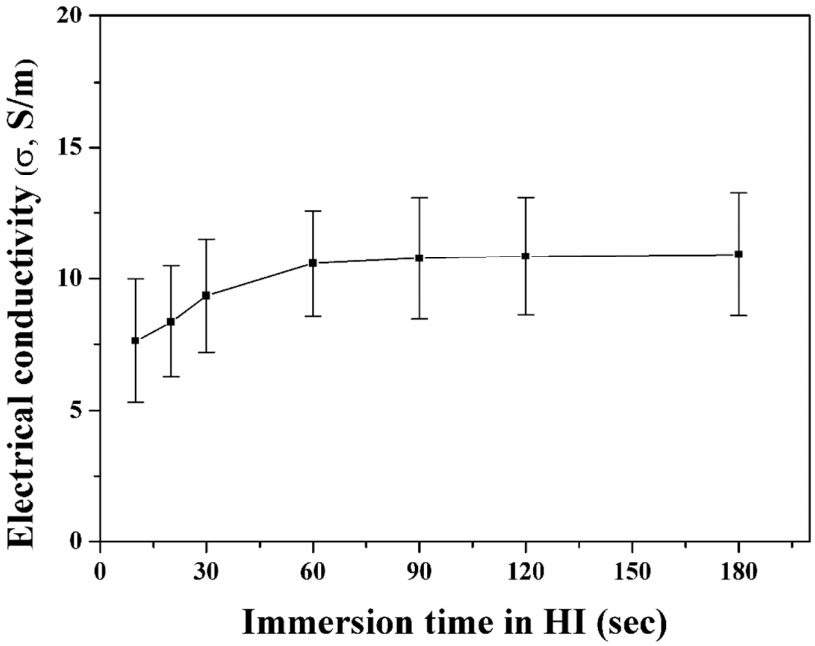

Figure S5 The electrical conductivity (σ) of r-GO/WPU-20 composites measured at room temperature as a function of immersion time in HI.

Table S1 Comparison of EMI SE of different graphene-based polymer composites.

Sample	EMI SE/ thickness of sample	Reference
Graphene/PDMS foam composites	20 dB/ 1 mm	Adv. Mater. 2013, 25, 1296–1300[9]
R-GO/paraffin wax composites	29.68 dB/ 2 mm	Nanoscale, 2014,6, 5754-5761[10]
Graphene/Epoxy composites	21 dB/ > 2 mm	CARBON 47 (2009) 922–925[11]
Graphene/PMMA composites	30 dB/ 3.4 mm	CARBON 50 (2012) 5117 – 5125[12]
Graphene/PEI foam composite	44 dB/ 2.3 mm	ACS Appl. Mater. Interfaces 2013, 5, 2677−2684[13]
Graphene/PS composite	29 dB/ 2.5 mm	J. Mater. Chem., 2012, 22, 18772[14]
R-GO/WPU composite	32 dB/ 2 mm	CARBON 60 (2013) 57–66[15]
R-GO/WPU composite	34 dB/ 1 mm	This study

References

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