

Supporting Information

Fabrication of polyamide 6 nanocomposite with improved thermal conductivity and mechanical properties by incorporating low content of graphene

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Table S1. Apparent density and specific surface area of graphene aerogel constructed in water and PA6 monomers filled 3D graphene network

Samples	ρ_{app}^a (mg/cm ³)	S_{BET}^b (m ² /g)
Graphene aerogel constructed in water	14.68	143
PA6 monomers filled 3D graphene network^c	12.13	367

[a] Apparent density (ρ_{app}) was calculated from the weight and volumes of the foam;

[b] Brunauer–Emmett–Teller specific surface area (S_{BET}) were characterized by the nitrogen adsorption–desorption measurement

[c] The sample was prepared from the solution in which the concentration of GO was 0.15wt% and was removed free PA monomers.

Table S2. Molecular weight of free polyamide 6

Samples	$[\eta]^a$	$M\eta^b$
PA6	0.81	2.16×10^4
GN0.16PA6	0.69	1.80×10^4
GN0.25PA6	0.63	1.58×10^4
GN0.31PA6	0.54	1.30×10^4

[a] Intrinsic viscosity (η) of free nylon-6 of NG composites, which was measured at 25°C in 85% formic acid solution by a Ubbelohde viscometer.

[b] The molecular weight ($M\eta$) of free PA6 thereof was calculated from Mark-Houwink equation, where $K=2.26 \times 10^{-4}$ and $\alpha=0.82$ at 25°C

Table S3. Values of thermal conductivity and enhancement per wt.% of graphene-related polymeric composites.

Sample	filler	Filler content (wt.%)	Thermal conductivity (W/(mK))	Enhancement per wt.%	Ref.
graphene/EP	Py-PGMA modified graphene	0.33	0.5	757	[1]
graphene/PA6	graphene nanoribbon	0.3	0.38	603	[2]
graphene/PA	TCA modified rGO	1	1.15	575	[3]
GA/PDMS	Garphene aerogel	0.2	0.5	550	[4]
GP/SR	KH550 modified graphene	0.36	0.28	390	[5]
ApPOSS-graphene/EP	ApPOSS modified graphene	0.25	0.304	550	[6]
RGO/TPU	Reduced GO	0.3	0.5	870	[7]
HGA/PEG	Hybrid graphene aerogel	0.5	0.42	270	[8]
IL-G/PU	Ionic liquid modified graphene/PU	0.608	0.3012	220	[9]
BE/graphene	Polyester modified graphene	0.28	0.325	610	[10]
CNTs/epoxy	MWNT	0.5	0.21	350	[11]
Epoxy/DWCNT	DWCNT	0.3	0.25	345	[12]
GN0.25PA6	3D graphene network	0.25	0.69	1152	This work
GN0.31PA6	3D graphene network	0.31	0.73	981	This work

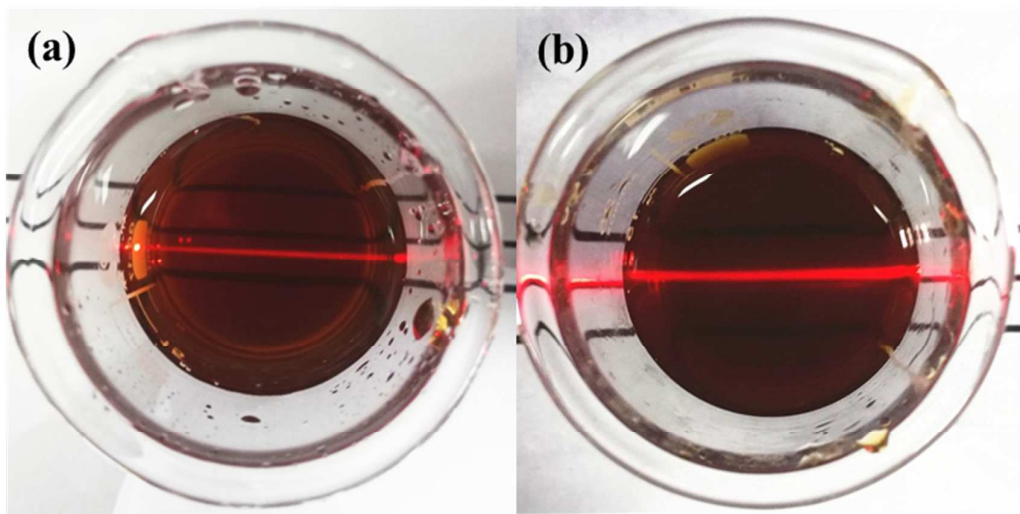


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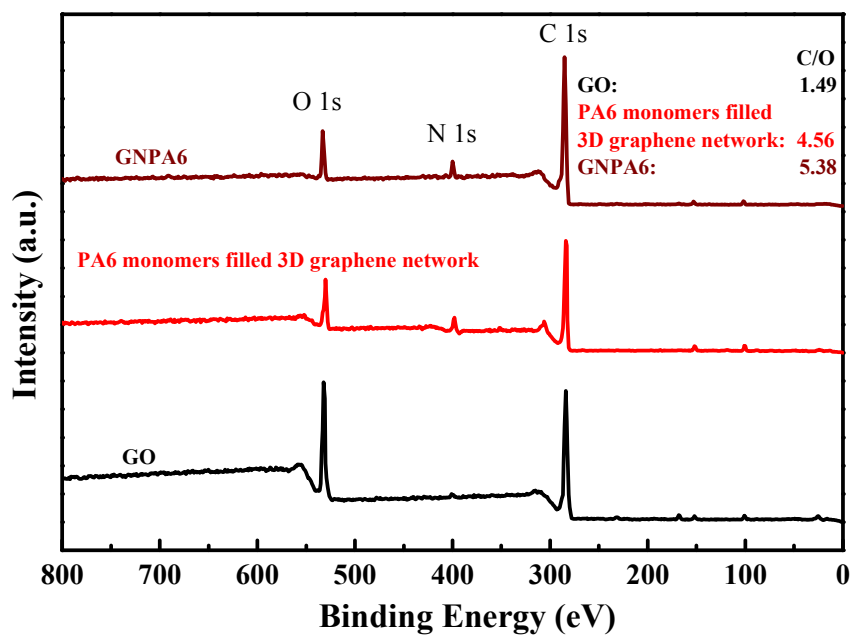


Figure S2. XPS spectra of GO, PA6 monomers filled 3D graphene network and GNPA6

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