Supplementary Information

Graphene oxide as a covalent-crosslink agent for EVM-g-PA6 thermoplastic elastomeric nanocomposites

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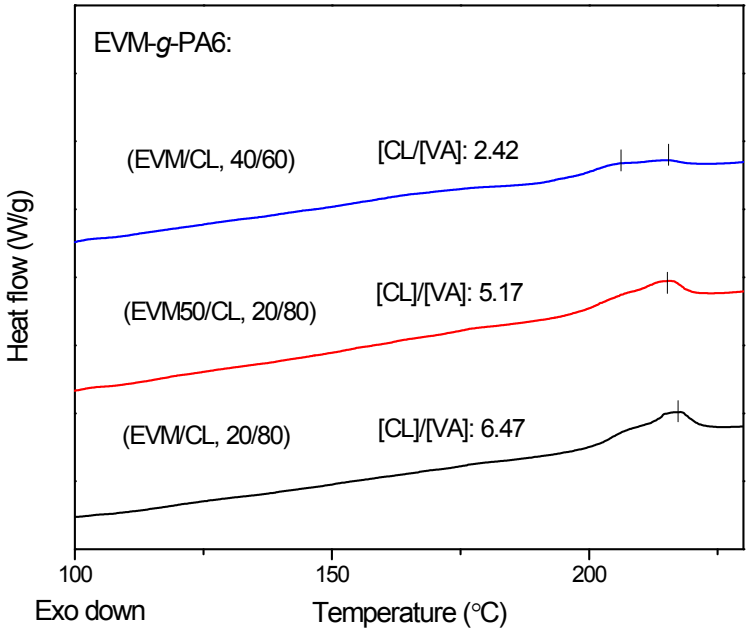

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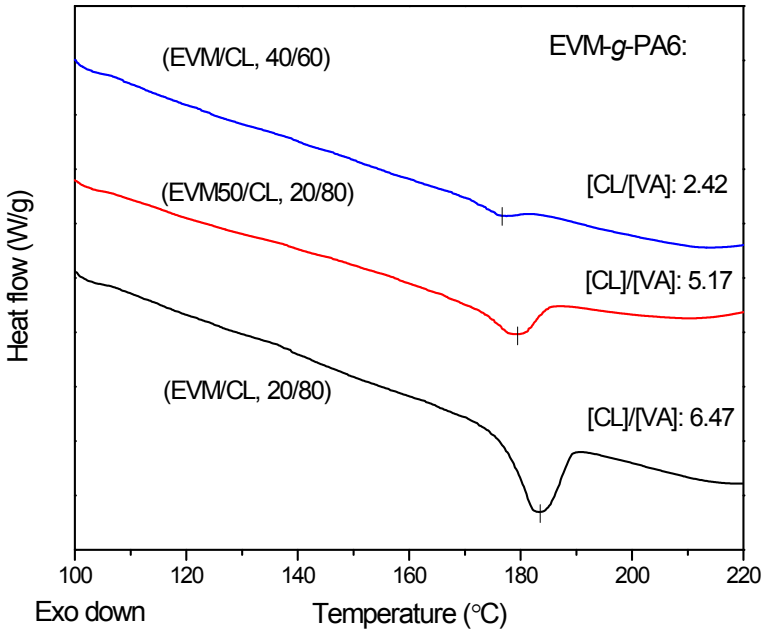
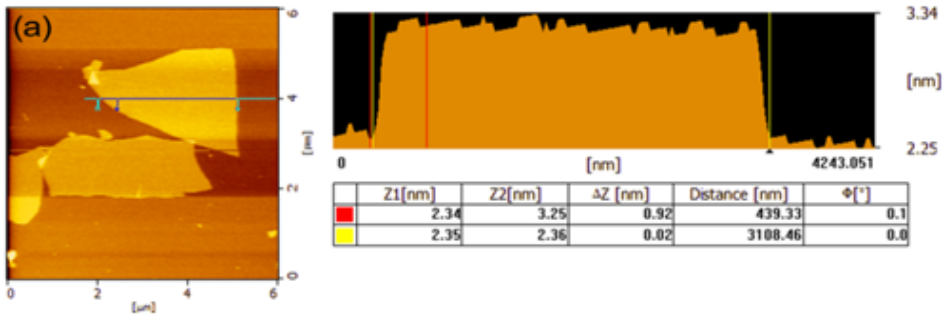


Fig. S1. DSC heating scanning (a) and cooling scanning (b) curves of EVM-*g*-PA6 copolymers from EVM/CL reaction mixtures at 230 °C for 5 h.



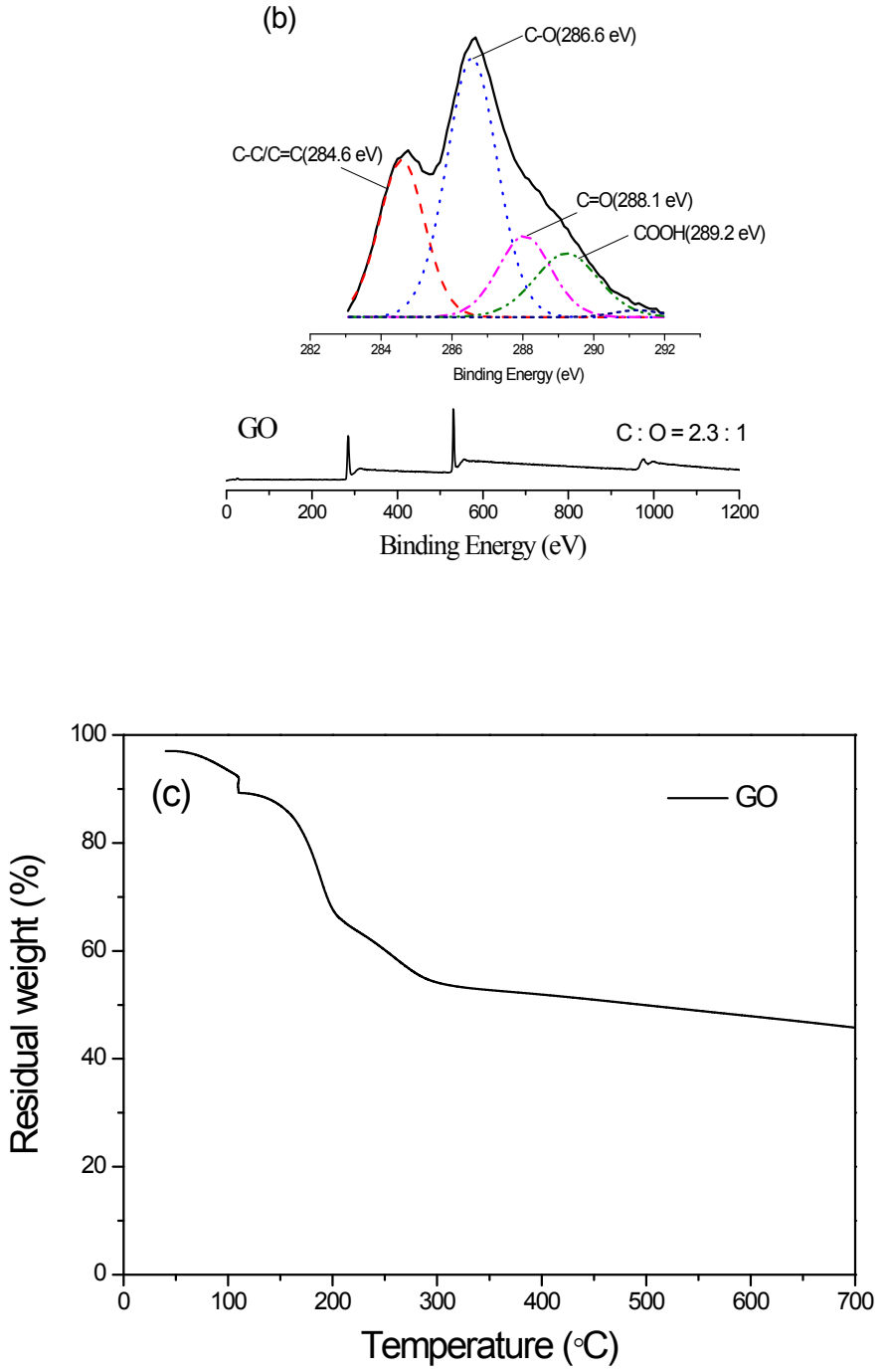
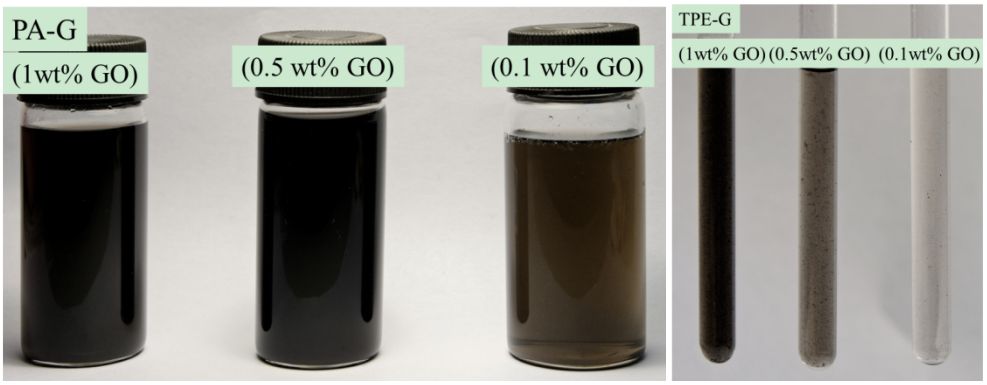


Fig. S2. (a) A tapping mode AFM image of GO nanosheets and the height profile; (b) Survey X-ray photoelectron spectrum of GO and the corresponding C1s spectrum[20]; (c) TGA curve of GO in nitrogen.



(a) (b)

Fig. S3. Digital images of dispersions of the extracted PA6 grafted graphene in formic acid (a), and copolymer grafted graphene in $CHCl_3/CF_3COOH$ (1/1 v/v) (b) at different GO loadings.

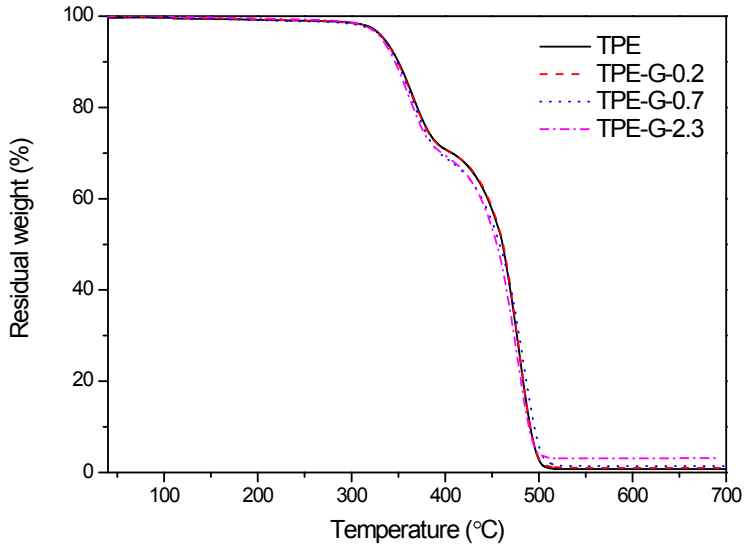


Fig. S4. TGA curves of EVM-*g*-PA6/graphene composites in N_2.

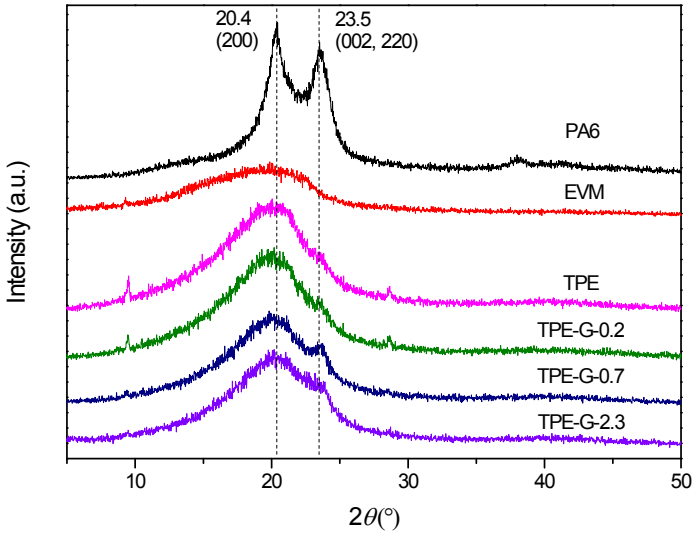
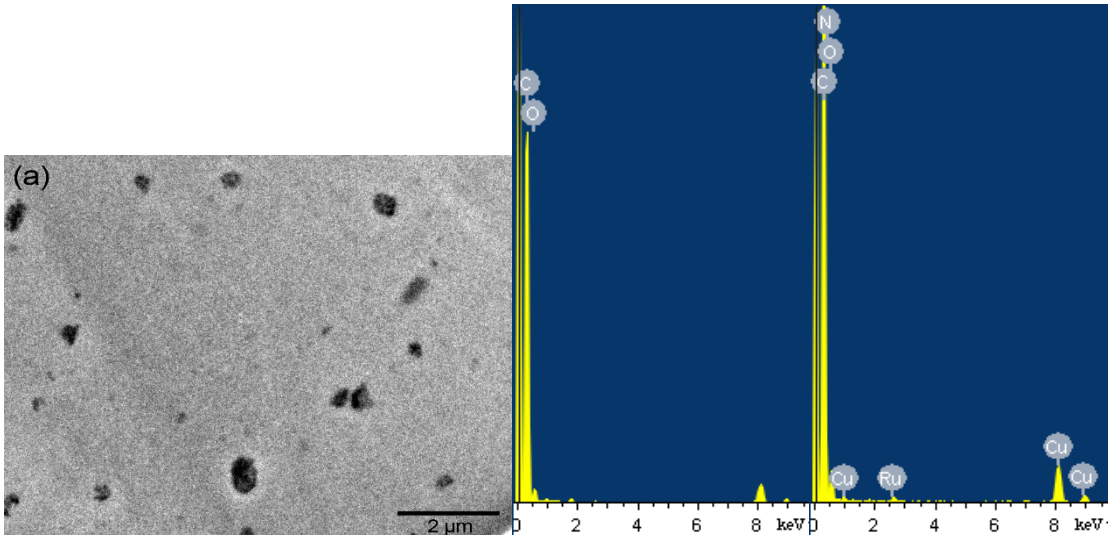


Fig. S5. XRD patterns of EVM-*g*-PA6/graphene composites.



(a) EVM-g-PA6 (b) bright area (c) darkly tinted domain

Fig.S6. Localized elemental analysis of the bright area (b) and the darkly tinted domain (c) of the TEM result of EVM-g-PA6 (a)

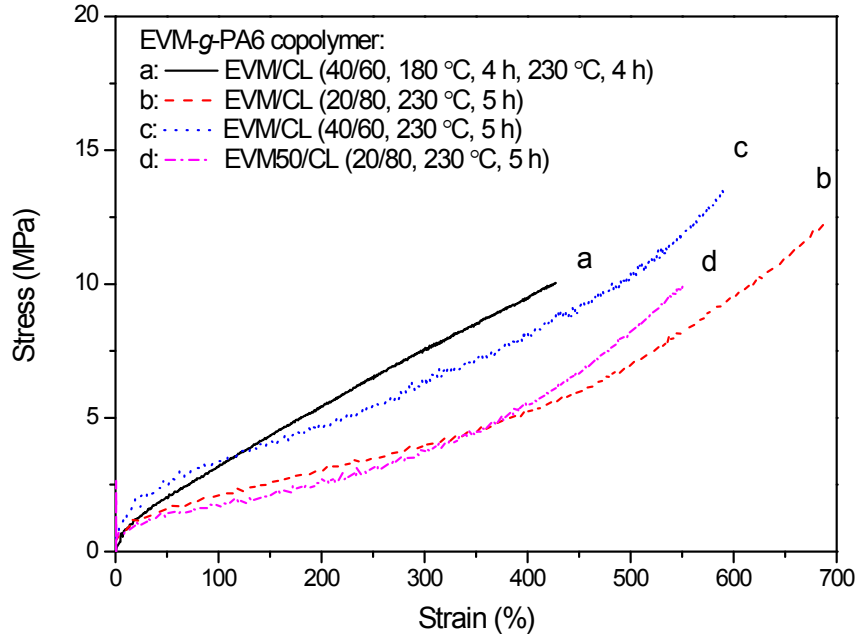
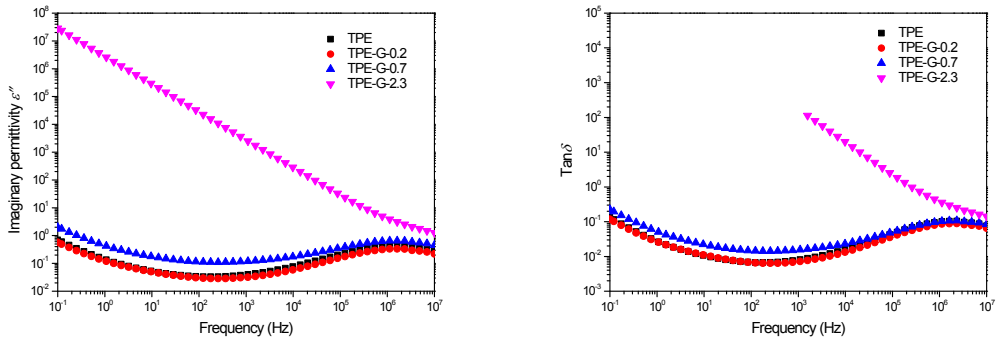


Fig. S7. Tensile stress-strain curves of EVM-*g*-PA6 copolymers with various PA6 contents.



(a) (b)

Fig. S8. Dielectric parameters of EVM-*g*-PA6/graphene composites as a function of frequency at room temperature. (a) Imaginary permittivity, (b) Dielectric loss factor.

Table S1 PA6 content in the EVM-*g*-PA6 copolymer extracted from reaction mixtures under different conditions.

EVM-*g*-PA6	EVM/CL (40/60, 180 °C, 4 h, 230 °C, 4 h)	EVM/CL (40/60, 230 °C, 5 h)	EVM/CL (20/80, 230 °C, 5 h)	EVM/CL (20/80, 230 °C, 8 h)

PA6 content (wt%)	6.0	5.7	4.0	5.6

Table S2 PA6 content of the EVM-*g*-PA6 copolymer/graphene composites.

EVM-*g*-PA6/graphene	TPE	TPE-G-0.2	TPE-G-0.5	TPE-G-2.3
PA6 content (wt%)	6.0	6.8	13.1	12.5

Table S3 DSC results of the extracted copolymer/graphene composites.

	T_m (°C)	T_c (°C)	ΔH_m (J/g)	X_m (%)	ΔH_c (J/g)	X_c (%)	T_g (°C)
TPE	215.3	182.0	2.92	20.3	-0.53	3.7	-28.8
TPE-G-0.2	215.1	189.5	4.06	24.9	-3.12	19.1	-28.4
TPE-G-0.7	211.4	186.9	8.09	25.7	-7.42	23.6	-29.3
TPE-G-2.3	210.8	186.6	3.70	12.3	-3.41	11.4	-29.2