

Electronic Supplementary Information

Effects of graphene oxide on surface energy, mechanical, damping and thermal properties of ethylene-propylene-diene rubber/petroleum resin blends

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Dispersion of G-O into EPDM(/PR) matrices

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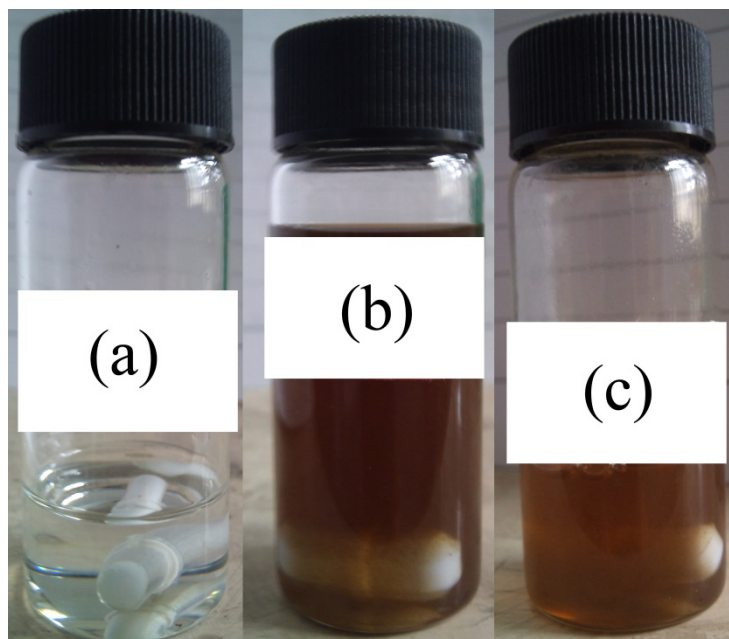


Fig. S1 (a) EPDM/toluene solution (b) G-O/THF solution (c) G-O/EPDM/ THF/toluene solution

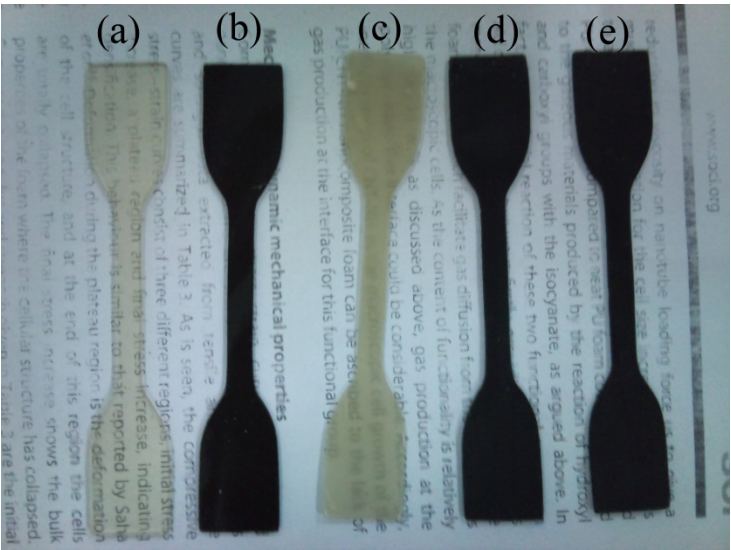


Fig. S2 Vulcanized samples (a) EPDM, (b) G-O/ EPDM composite with G-O concentration of 0.5 wt%, (c) EPDM/PR blend and G-O/ EPDM/PR composites with G-O concentration of (d) 0.2 wt%, (e) 0.5 wt%

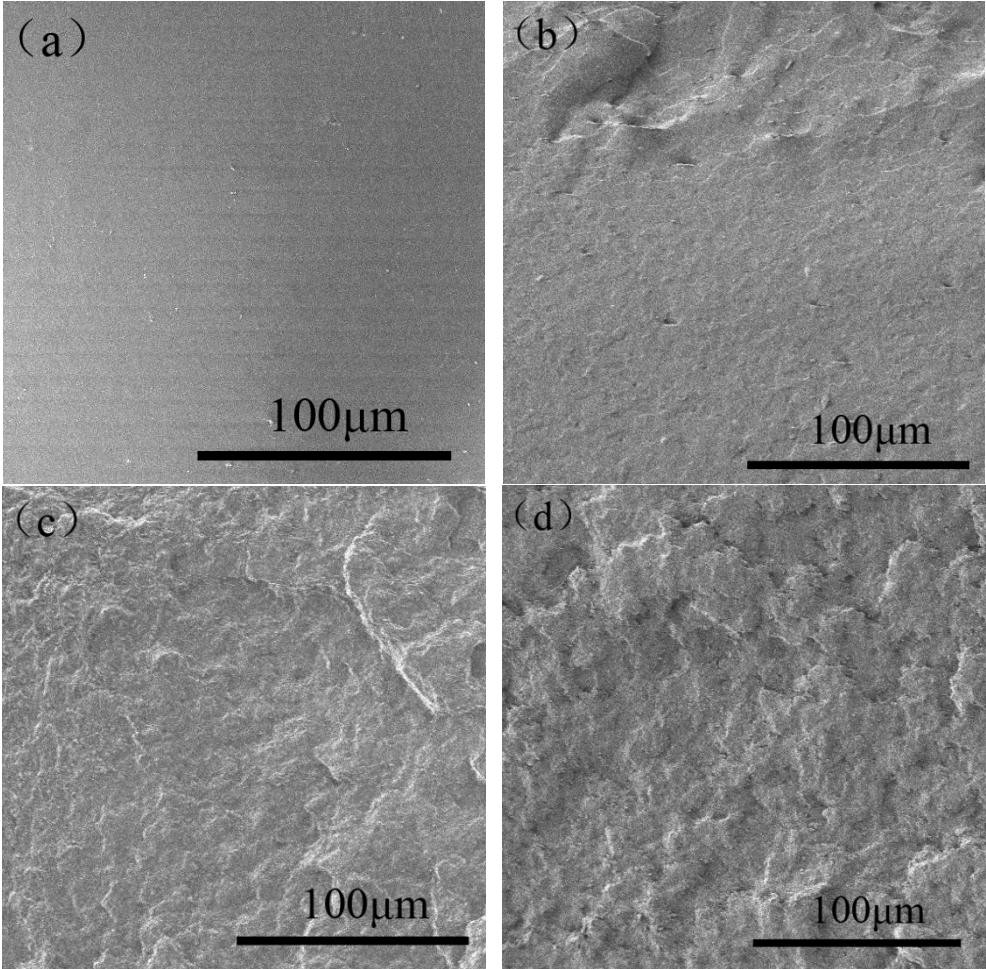
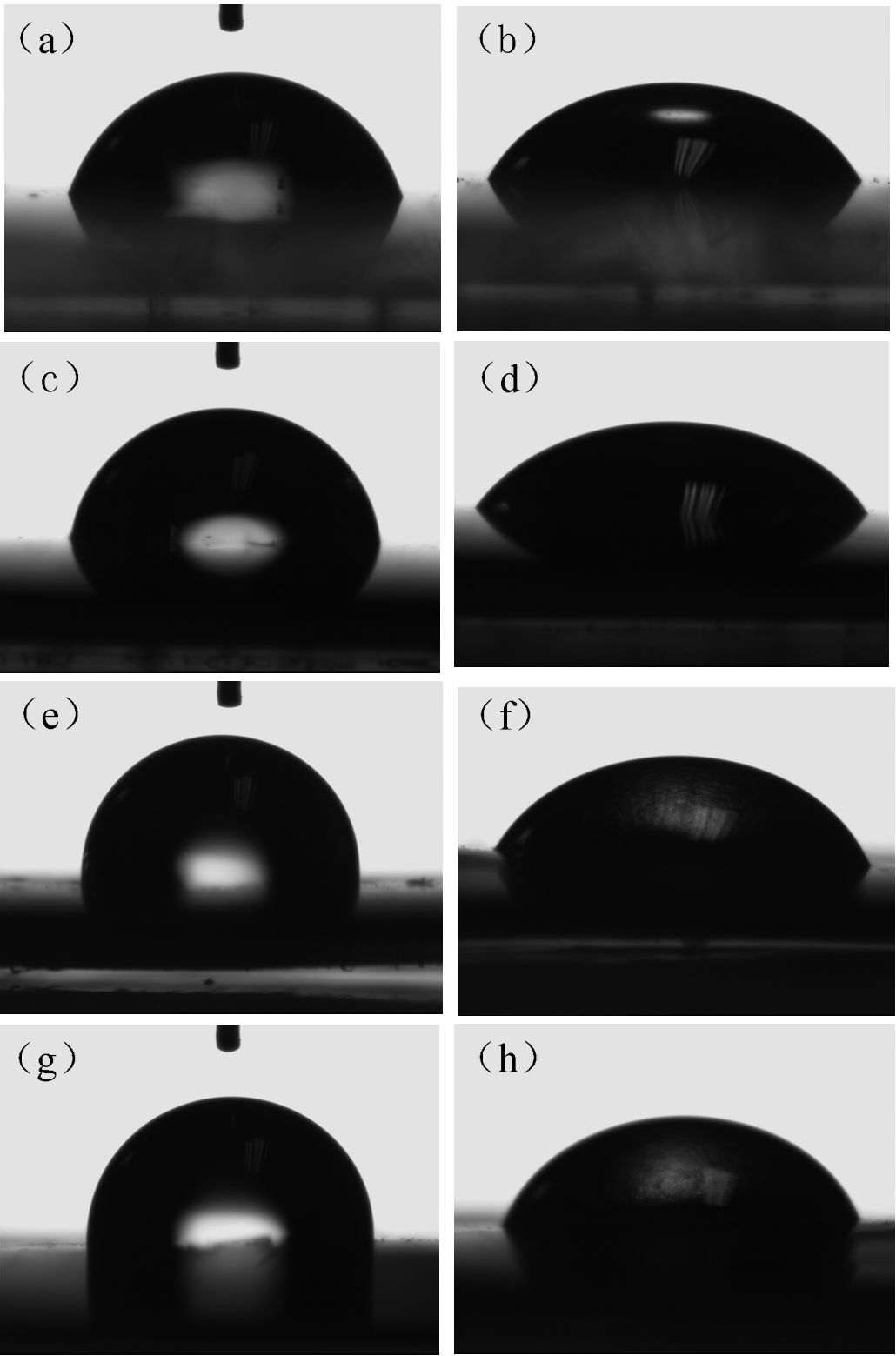


Fig. S3 Low magnification (250 ×) SEM cross-sectional images of (a) EPDM, (b) G-O/EPDM composites with G-O concentration of 0.5 wt%, (c) EPDM/PR blend, (d) G-O/EPDM/PR composites with G-O concentration of 0.5 wt%

Effects of G-O on surface energy of G-O/EPDM(PR) composites



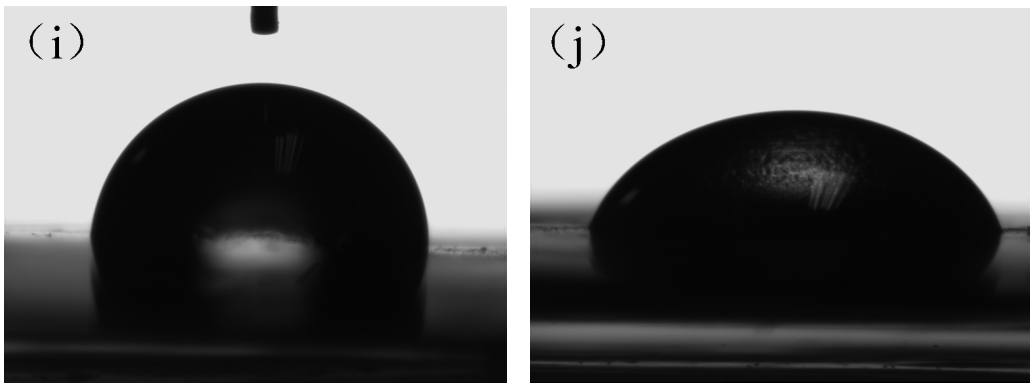


Fig. S4 Contact angle tests under deionized water (left), diiodomethane (right). EPDM (a), (b); G-O/EPDM composites with G-O concentration of 0.5 wt% (c), (d); EPDM/PR blend (e), (f); G-O/EPDM/PR composites with G-O concentration of 0.2 wt% (g), (h), 0.5 wt% (i), (j).

5 **Mechanical properties of G-O/EPDM(/PR) composites**

Table S1 Mechanical properties of G-O/EPDM(/PR) composites

Matrix	G-O Contents (wt%)	Stress at 200%, MPa	Stress at 300%, MPa	$N-E_b^a$, %	Permanent set, %
EPDM	0	-	-	100	1
	0.5	2.7±0.2	-	133	1
EPDM/P R	0	4.5±0.2	7.1±0.4	100	30
	0.2	4.7±0.5	7.3±0.4	101	20
	0.5	3.6±0.4	5.8±0.4	118	35

^a $N-E_b$: Elongation at break normalized by 0 wt% G-O

10 **Dynamic mechanical properties of G-O/EPDM(/PR) composites**

Table S2 Dynamic mechanical properties of G-O/EPDM(/PR) composites

Matrix	G-O Contents (wt%)	T_g , °C	Tan δ	Temperature Range, °C
EPDM	0	-23.8	0.51	-31.1~-14.2
	0.5	-25.3	0.53	-33.1~-15.1
EPDM/PR	0	27.2	0.67	4.3~56.0
	0.2	30.3	0.75	4.8~62.7
	0.5	27.6	0.64	3.8~60.4

15 **Thermal properties of G-O/EPDM(/PR) composites**

Table S3 Thermal properties of G-O/EPDM(/PR) composites

Matrix	G-O Contents (wt%)	T_5 , °C	T_{onset} , °C	T_p , °C
EPDM	0	433	455	477
	0.5	432	450	472
EPDM/PR	0	271	396	463
	0.2	271	399	460
	0.5	281	400	463