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Non-covalent Functionalization of Graphene Oxide by Pyrene-Block Copolymers for Enhancing Physical Properties of Poly (methyl methacrylate)

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†Electronic Supplementary Information (ESI) available: GPC of Py-PMMA-Br and Py-PMMA-*b*-PDMS, FTIR spectrum of GO, GO@Py-PMMA-*b*-PDMS and Py-PMMA-*b*-PDMS, DSC spectra, SEM images and summary of composites mechanical properties. See DOI: 10.1039/x0xx00000x

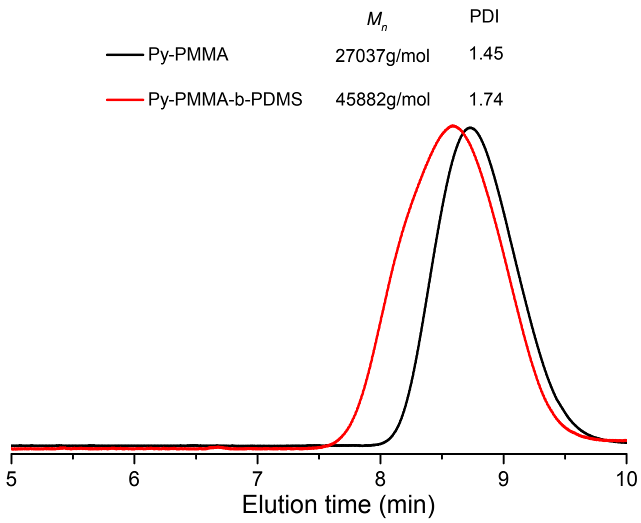

Figure S1.GPC traces of Py-PMMA-Br and Py-PMMA-*b*-PDMS in DMF with flow rate of 1ml/min.

Table S1 Experimental characteristics of the Py-PMMA-Br and Py-PMMA-*b*-PDMS when polymerization via ARGET ATRP from initiator Py-Br.

Sample	**DP_{target}**	**Conv.[a]/ %**	**$M_{n,theo}$[b]/ g mol^{-1}**	**$M_{n,GPC}$[c]/ g mol^{-1}**	**PDI[c]**	**DP_{MM}[d]**	**DP_{VTDM}[d]**
Py-PMMA-Br	400	54	21901	27037	1.45	216	-
Py-PMMA-*b*-PDMS	40	8.7	41841	45882	1.74	216	3.5

[a] Conversion was obtained gravimetrically.

[b] $M_{n,theo} = M_{initiator} + ([monomer]_0/[initiator]_0) \times conversion \times M_{monomer}$.

[c] M_n based on GPC using DMF as eluent and PMMA as standards.

[d] (degree of polymerization) calculated by conversion.

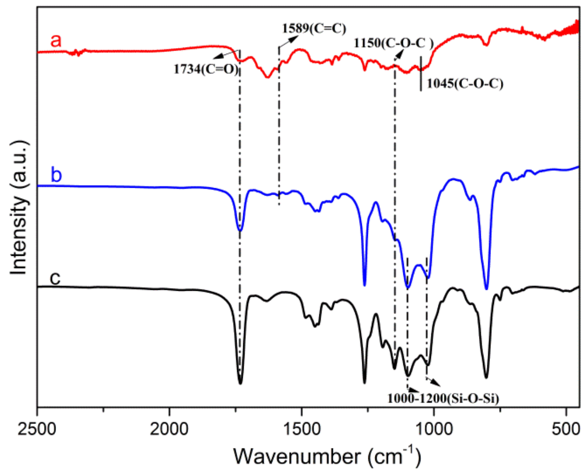

Figure S2. FT-IR spectra of (a) GO, (b) GO@ Py-PMMA-*b*-PDMS and (c) Py-PMMA-*b*-PDMS.

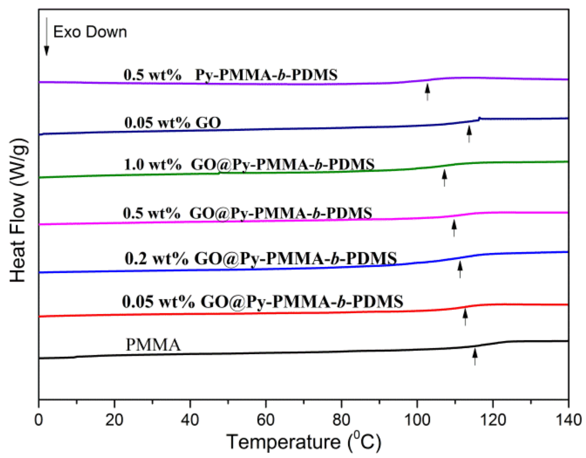

Figure S3. DSC spectra of pure PMMA and composites containing different loading amounts of GO in GO@Py-PMMA-*b*-PDMS/PMMA, 0.5 wt% Py-PMMA-*b*-PDMS and 0.05 wt% GO.

Table S2 Summary of Young's modulus, tensile strength, elongation at break and toughness of PMMA and composites from stress-strain curves at 30°C.

GO@Py-PMMA-*b*-PDMS Content (wt%)	Young's modulus (MPa)	Tensile strength (MPa)	Elongation at break (%)	Toughness (J/g)
0	846.3±27.3	16.4±0.8	39.6±1.9	5.1±0.1
0.05wt%	1037.1±51.1	25.1±1.2	86.1±4.3	16.2±0.4
0.2wt%	1214.5±60.5	26.8±1.3	60.5±3.0	12.4±0.3
0.5wt%	1067.6±53.2	25.7±1.3	68.9±3.4	13.7±0.3
1.0wt%	1020.6±51.0	21.1±1.1	66.6±3.3	10.7±0.2
Py-PMMA-*b*-PDMS (0.5 wt%)	809.6±73.1	17.2±1.1	88.9±4.4	10.8±0.3
GO (0.05 wt%)	906.6±73.1	20.5±1.3	13.2±3.2	3.9±0.2

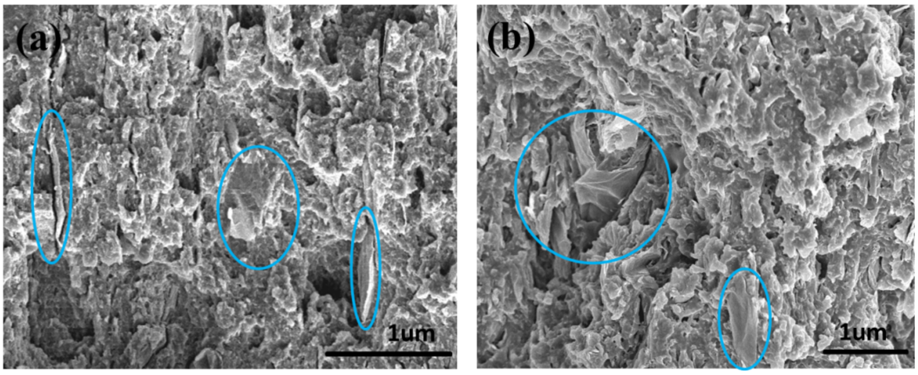

Figure S4. The high-magnification SEM images of the selected regions: (a) 0.5 wt% GO and (b) 1.0 wt% GO in GO@Py-PMMA-*b*-PDMS/PMMA.