

High-Strength GO/PA66 Nanocomposite Fibers via In Situ Precipitation and Polymerization

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Preparation of GO

1 g of 800 mesh graphite powder was mixed with 50 mL of 98% H₂SO₄ at 10 °C in an ice water bath, and 4 g of KMnO₄ was then slowly added into the mixture. The temperature of reaction system was raised to 50 °C and kept for 1 h. After cooling down to room temperature, 150 mL deionized (DI) water was added into the mixture with slow stirring until a homogeneous solution was obtained. Then, 4 mL of H₂O₂ was added to obtain the graphite oxide stock solution. The solution was further centrifuged at 4500 rpm and washed with DI water until the supernatant became neutral. Finally, ultrasonication was carried out for 4 h to obtain the 2 g/L aqueous GO solution. The GO solution was concentrated by using cross-flow membrane filtration to obtain the 10 g/L high-concentration GO dispersion for the convenience of subsequent solution replacement.

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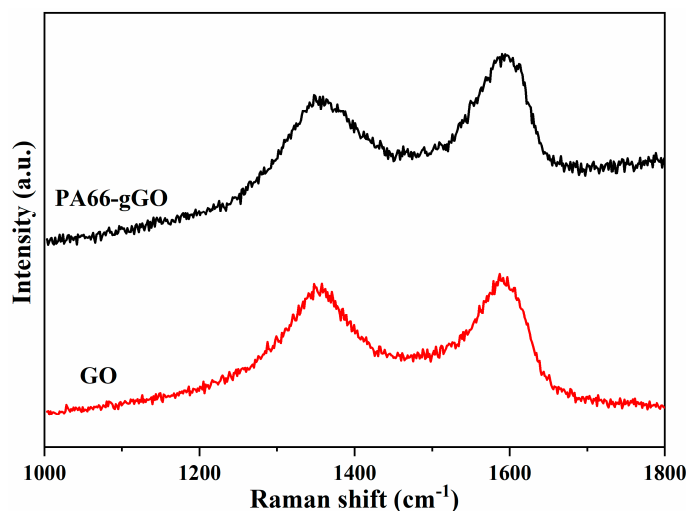


Figure S1. Raman spectra of PA66-gGO and GO.

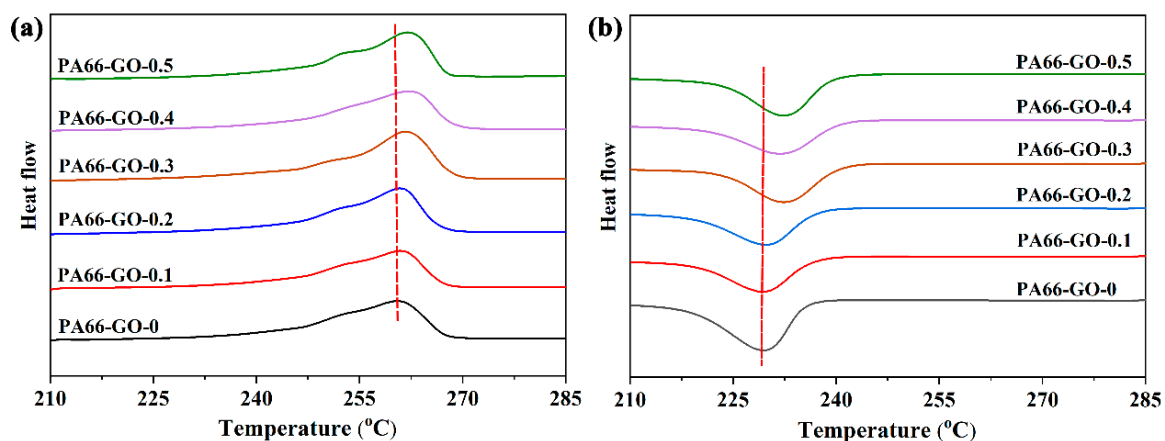


Figure S2. DSC (a) melting and (b) crystallization curves of GO/PA66 nanocomposites.

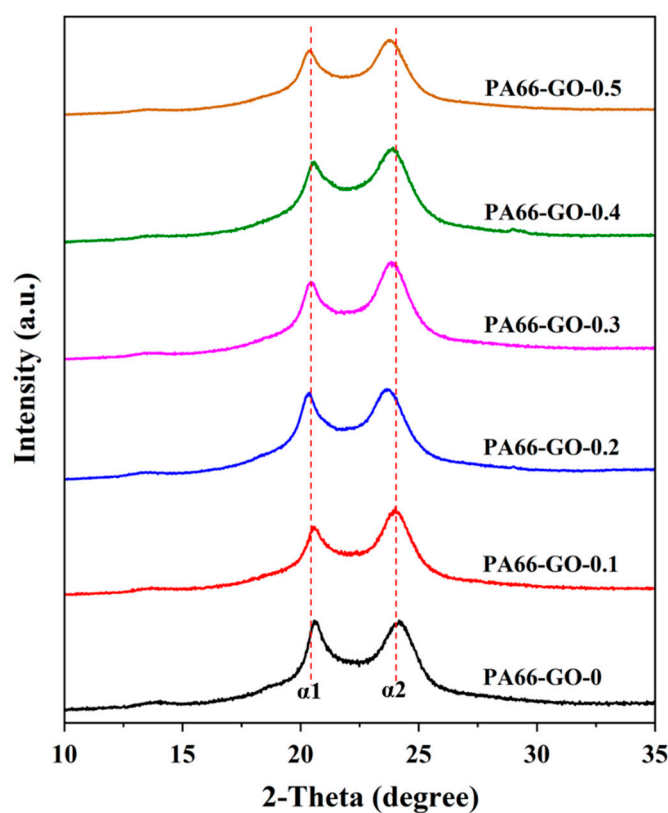


Figure S3. XRD patterns of PA66-GO-0, PA66-GO-0.1, PA66-GO-0.2, PA66-GO-0.3, PA66-GO-0.4, and PA66-GO-0.5 nanocomposite fibers.

Table S1. Comparison on the mechanical properties of graphene-based PA66 composites.

Fillers	GO content (wt%)	Tensile strength (MPa)	Young's modulus (GPa)	Sources
GO	0.3	710	3.2	Our work
Graphene	0.1	575	1.96	Ref. 1 ¹
GNP	1	80	2.8	Ref. 2 ²
RGO	1	84	0.6	Ref. 3 ³
NC/GO	5	78.2	2.5	Ref. 4 ⁴
RGO	0.3	95	1.5	Ref. 5 ⁵
GNP	1	33	0.55	Ref. 6 ⁶

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