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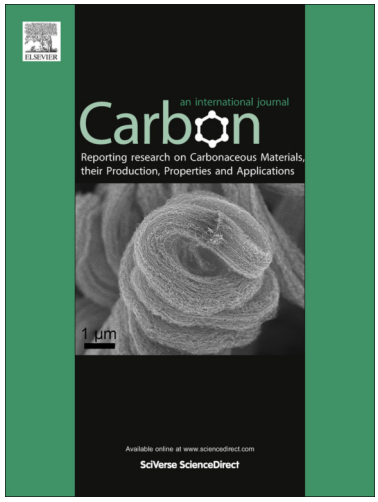

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Highly thermal conductive composites with polyamide-6 covalently-grafted graphene by an in situ polymerization and thermal reduction process

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ABSTRACT

The thermal conductive polyamide-6/graphene (PG) composite is synthesized by in situ ring-opening polymerization reaction using ε-caprolactam as the monomer, 6-aminocaproic acid as the initiator and reduced graphene oxide (RGO) as the thermal conductive filler. The generated polyamide-6 (PA6) chains are covalently grafted onto graphene oxide (GO) sheets through the "grafting to" strategy with the simultaneous thermal reduction reaction from GO to RGO. The homogeneous dispersion of RGO sheets in PG composite favors the formation of the consecutive thermal conductive paths or networks at a relatively low GO sheets loading, which improves the thermal conductivity (λ) from 0.196 $W \cdot m^{-1} \cdot K^{-1}$ of neat PA6 to 0.416 $W \cdot m^{-1} \cdot K^{-1}$ of PG composite with only 10 wt% GO sheets loading.

1. Introduction

Graphene has been regarded as the highly efficient thermal interface material, remarkable thermal control material and conductive alternative filler in composites,

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