

Thermal and mechanical properties of alkylated graphene nanoplatelets/polypropylene composites

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Two-dimensional graphene nanoplatelets and graphene-based materials have garnered significant attention in recent years due to their excellent materials properties. Graphene nanoplatelets have a large amount of oxygen functional groups like hydroxy and epoxy so that they can be easily surface modified via a simple reaction. In this study, to improve interfacial interaction between graphene nanoplatelets and polypropylene the hydrophilic nature of graphene nanoplatelets was modified to have a hydrophobic nature by alkylation. To investigate the effects of alkyl chain length, graphene nanoplatelets were alkylated by various alkylamines respectively via an epoxy-amine reaction. The alkylation of graphene nanoplatelets were confirmed by FTIR and TGA. Alkylated graphene nanoplatelets/polypropylene composites were prepared by melt-blending. The thermal and mechanical properties of the composites were measured by DSC, DMA, UTM and izod impact tester. The alkylation of graphene nanoplatelets improved the thermal and mechanical properties of the composites.