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Synergistic Influence from the Hybridization of Boron Nitride and Graphene Oxide Nanosheets on the Thermal Conductivity and Mechanical Properties of Polymer Nanocomposites

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Abstract

Enhancing the thermal conductivity of polymers by introducing inorganic fillers with low content remains challenge in modern electronic industries. By homogeneously incorporating both functionalised boron nitride nanosheets and graphene oxide nanosheets at low loading less than 1wt%, a poly(vinyl alcohol) (PVA) polymer was able to reach in-plane thermal conductivity of 9.90 W/m·K as well as achieve high extensibility and toughness. Synergistic influences of both nanofillers were observed and the improved nanofiller/matrix interfaces and the nanofiller distribution were ascribed to the remarkable enhancement in thermal conductivity. The facile fabrication process has potential to be scaled-up that has significance in preparation of thermal conductive polymers and composites for heat dissipation.