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Fabrication, characterization and application of graphene-polymer nanocomposites; a review

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As graphene has developed into an advanced carbon nanomaterial, it is logical to add graphene to polymeric composites either in bulks or as fibers to enhance their performance and implement functionalities. It is reasonable to expect some significant improvement in a range of properties in the composite with grapheme as nanaofiller. Polymer matrix Nano composites with grapheme and its derivatives as fillers have shown a great potential for various important applications, such as electronics, green energy, aerospace and automotive industries. There are three main methods for incorporation of grapheme into polymer matrices that are commonly used. The main methods are; in-situ polymerization, melt intercalation technique and solution mixing. Significant improvement in strength, facture toughness and fatigue strength has also been achieved in nanocomposites. These factors can be altered by the fabrication process and methods. The advantage of grapheme in comparison with other fillers is that it allows for large changes in the properties of composites. Therefore, grapheme-polymer nanocomposites have demonstrated a great potential to serve as next generation functional or structural materials.

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