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Reinforcement of polymer composite with graphene; A review

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The replacement of heavy weight steel by other material stronger than steel but much lighter than steel is needed. Though some polymers meet this requirement to some extent, their strength has not been very satisfactory. Graphene with suitable polymer can satisfy various requirements. An illustration of that is good mechanical, thermal, electrical, flame retardant properties, etc. However, these special properties of graphene composites with polymer largely depends on the distribution of graphene in the polymer matrix. It also depends upon the interfacial bonding between polymer and the graphene. Therefore, the properties of the composites depend upon the method of preparation. Researchers have found that adding graphene to epoxy composites may result in stronger/stiffer components than epoxy composites using a similar weight of carbon nanotubes. Graphene appears to bond better to the polymers in the epoxy, allowing a more effective coupling of the graphene into the structure of the composite. This property could result in the manufacture of components with high strength to weight ratio for such uses as windmill blades or aircraft components.

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