# PREPARATION AND PROPERTIES OF POLYIMIDE/GRAPHENE NANOCOMPOSITES

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## ABSTRACT

Graphene, a two-dimensional atomically thin honeycomb lattice, has emerged as the subject of tremendous interest because of its unique structure and outstanding physical, thermal, mechanical, and electron transport properties. Graphene has a lot of potential applications, such as in catalysts, photovoltaics, field effect transistors, and in gas storage or gas sensors. In particular, functionalized graphene (FG) is a general name for graphene oxide (GO) and graphene with other functionalities. FG still possesses most of the physical properties of graphene even though it has a partly damaged carbon structure and the functionalities on the surface of graphene can enhance the dispersion of graphene in polymeric matrices. The functional groups on the graphene surface give GO its hydrophilic character, allowing it to disperse well and swell in water and organic solvents such as dimethylformamide and tetrahydrofuran. Therefore, FG has natural advantages as an ideal nanofiller for polymer hybrids. In this sense, recently, the interest in polymer-graphene hybrids has increased significantly because of the unique properties of graphene as a filler. In hybrid materials, not only is the tuning of the interfacial interaction between graphene and the polymer important, but also the homogeneous dispersion state is key to achieving the high performance of the resulting hybrids. In this presentation, we report on the preparation and properties of polyimide/graphene hybrids, where graphene was randomly dispersed in a polyimide matrix, leading to the enhancement of mechanical properties as well as some other (barrier or optical) properties.

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