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**Main structural features of graphene materials controlling the transport  
properties of epoxy resin-based composites**

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**Abstract**

Graphene materials (GMs) are deeply studied as nanoreinforcements of polymer matrices, especially for epoxy matrices. Here, we analyze the effect of GMs on the transport properties of a poly(bisphenol A-co-epichlorohydrin) resin. In particular, we focus on the effect of the morphology, chemical composition and structure of different GMs obtained by varying the reduction temperature of the thermal/exfoliation treatment of graphite oxide synthesized by a modified Hummers method. The dispersion degree of the GMs was studied by microscopy techniques, showing a strong dependence on the specific surface area and chemical composition of the graphene material. The transport properties imposed different requirements on GMs. The thermal conductivity benefited from a high aromatic restoration. Meanwhile, the electrical conductivity required the right balance of filler/matrix interaction and aromatic restoration.

**Keywords:** Graphene; Epoxy; Transport properties; Polymer nanocomposites

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