

Graphene Oxides Dispersing Graphene Sheets: Unique Nanocomposites of Metal-Like Thermal Transport Performance and Beyond

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Graphene oxides (GOs), beyond their widely reported use as precursors for single-layer graphene sheets, are in fact excellent materials themselves. In the reported work we used aqueous GOs to effectively disperse few-layer graphene sheets (GNs) in suspension for facile wet-processing into nanocomposites of GNs embedded in GOs (as the polymeric matrix). The resulting light-weight and plastic-like nanocomposite materials remained mechanically flexible even at high loadings of GNs, and they were found to be highly efficient in thermal transport, with the experimentally determined thermal diffusivity competitive to those typically observed only in well-known thermal conductive metals such as aluminum and copper. As demonstrated, GOs apparently represent a unique class of two-dimensional polymeric materials for potentially “all-carbon” nanocomposites, among others, which may find technological applications independent of those widely proclaimed for graphene sheets.