



# Synthetic and Natural Nanofillers in Polymer Composites

Properties and Applications

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## 4 - Mechanical properties of epoxy/carbon nanotube composites

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### Abstract

This chapter discusses the basics of epoxy resin and the fabrication, characterization, and applications of epoxy composites. Nanofillers, especially those in polymer matrices such as epoxy thermosets, have gained huge advancements in composite technology and industry. Because of their small size, nanofillers have huge surface areas, which are key to enhancing the properties of composites. The surface area enhances the adhesion between the filler and the polymer; therefore, less effort is necessary for stress transfer from the matrix to the polymer. Carbon nanotubes (CNTs) are one-dimensional nanomaterials with a high aspect ratio, providing large surface areas and enhancing the properties of epoxy composites. On the other hand, CNTs tend to agglomerate due to van der Waals force, thus reducing composite properties. Methods include organic solvents, sonication, high-shear mixing, and functionalization to prevent aggregation and enhance composite properties. This chapter also discusses various other physical and chemical methods, hybridization, and potential applications.

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