

# Effect of Graphite Filler Loading Concentration on Physical and Mechanical Properties of Epoxy Matrix Composites

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## Abstract

The addition of filler materials to a polymer is a common practice to improve not only strength, stiffness, toughness, hardness, conductivity, wear resistance, and mold shrinkage but also reduces the processing cost significantly. Graphite has very weak bonds between the sheets and this structure makes graphite excellent dry lubricant. On the other hand graphite based polymer composites provides high electrical conductivity for using electromagnetic shielding, batteries, light emitting devices etc. Graphite reinforced composites have exceptional mechanical properties such as high stiffness, strength and light weight.

The main objective of this study is the use of graphite as a filler in epoxy matrices in order to reduce resin cost and improve mechanical properties. The effect of graphite content on physical properties and mechanical properties such as hardness, bending strength and elastic modulus was evaluated. The characterization of graphite filler was carried out by scanning electron microscopy (SEM) and X-ray diffraction (XRD) techniques. The results show that addition of 40 wt.% of graphite is optimum content for casting. The results revealed that bulk density increase and open porosity decrease with the addition of graphite content. Up to 40 wt.% of graphite loading, bending strength showed enhancement and then slightly decrease. Hardness values increase with the addition of graphite content.

**Keywords:** epoxy; graphite; bending strength; elastic modulus; hardness

Poster Presentation

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