

Effects of Carbon Nanotubes Functionalization and Geometrical Configurations on Mechanical Properties of Polymeric Nanocomposites

Ali Ghazinezami, Seyed Reza Hosseini Taklimi, Ravikumar Vijayan
Faculty: Davood Askari, PhD
Department of Mechanical Engineering, College of Engineering

Carbon nanotubes (CNTs) are among the most interesting nanostructures that exist in various geometrical configurations and size. They have demonstrated superior properties such as mechanical, thermal, and electrical which make them an ideal candidate for application as reinforcements in structural composite materials. CNTs can be functionalized by employing different chemical and physical techniques in order to improve their dispersion and adhesion to the polymers. There are different factors that can affect the quality of the final product like weight percentages, dispersion technique, curing process, processing method, nanomaterials shape and size. The main objective of this research is to investigate the effects of CNTs' functionalization, loading weight percentages, and geometrical configurations. Test samples were fabricated and then tested according to the American Society for Testing and Materials. Test results are analyzed and then discussed. In addition, Scanning electron and optical microscopy was performed to examine the fractured surfaces.

Keywords: Nanomaterials, Polymeric Nanocomposites, Carbon Nanotubes, Mechanical Properties, Thermal Properties, Functionalization, Characterization.