MULTI WALL CARBON NANOTUBE REINFORCED SILICONE FOR AEROSPACE APPLICATIONS

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ABSTRACT
Product design firstly requires the clear understanding of the requirement of the product. Strength and cost of the material are predominantly considered during the design. The strength of any material can be increased by incorporating fillers of the requirement. The percentage of filler, adhesion of filler with the material matrix, processing method is some parameters deciding the mechanical properties of the resultant composite. This research is focused on increasing the mechanical properties of Silicone elastomer by loading of 5wt% of multi-wall carbon nanotubes (MWCNTs) as fillers. The Silicone/MWCNT composite was masticated in two roll milling followed by compression molding. The tensile properties were measured through experiments as per ASTM D412 standard. The tensile strength, modulus and elongation at break of the filled nanocomposite are 7.21 MPa, 1.673 MPa and 235 mm. The compression strength of the filled composite was observed as 18.6 MPa at 83.3% of the compression. The shore hardness of the filled composite was increased from 40 to 64. It is perceived that the mechanical property of the filled nanocomposite is drastically increased by loading of MWCNTs. Fourier Transform Infrared Spectroscopy (FTIR) and Scanning Electron Microscope (SEM) studies were also done to understand the dispersion of the compound and mechanical damage in the developed composite. The results have shown the good wetting and high diffusion of nanofillers that led to the strong interfacial synergy interaction with silicone matrix. The resultant nanocomposite is regarded to be a high strength elastomeric material for aerospace product design.

KEYWORDS: Multi-Wall Carbon Nanotubes, Silicone Elastomer, Nanofillers & Compression Molding

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