World Academy of Science, Engineering and Technology
International Journal of Materials and Metallurgical Engineering
Vol:10, No:07, 2016

Compressive Response of Unidirectional Basalt Fiber/Epoxy/MWCNTs Composites

Authors : Reza Eslami-Farsani, Hamed Khosravi

Abstract : The aim of this work is to study the influence of multi-walled carbon nanotubes (MWCNTs) addition at various contents with respect to the matrix (0-0.5 wt.% at a step of 0.1 wt.%) on the compressive response of unidirectional basalt fiber (UD-BF)/epoxy composites. Toward this end, MWCNTs were firstly functionalized with 3-glycidoxypropyltrimethoxysilane (3-GPTMS) to improve their dispersion state and interfacial compatibility with the epoxy. Subsequently, UD-BF/epoxy and multiscale 3-GPTMS-MWCNTs/UD-BF/epoxy composites were prepared. The mechanical properties of the composites were determined by quasi-static compression test. The compressive strength of the composites was obtained through performing the compression test on the off-axis specimens and extracting their longitudinal compressive strength. Results demonstrated that the highest value in compressive strength was attained at 0.4 wt.% MWCNTs with 41% increase, compared to the BF/epoxy composite. Potential mechanisms behind these were implied.

Keywords : multiscale polymeric composites, unidirectional basalt fibers, multi-walled carbon nanotubes, surface modification, compressive properties
Conference Title : ICMSEM 2016 : International Conference on Materials Science, Engineering and Manufacturing
Conference Location : Paris, France
Conference Dates : July 25-26, 2016

Open Science Index, Materials and Metallurgical Engineering Vol:10, No:07, 2016 publications.waset.org/abstracts/53542/pdf