

Accepted Manuscript

Enhanced Thermomechanical and Electrical Properties of Multiwalled Carbon Nanotube Paper Reinforced Epoxy Laminar Composites

Sushant Sharma, Bhanu Pratap Singh, Sampat Singh Chauhan, Jeevan Jyoti, Abhishek Kr. Arya, S.R.Dhakate, Vipin Kumar, Tomohiro Yokozeki

PII: S1359-835X(17)30382-2
DOI: <https://doi.org/10.1016/j.compositesa.2017.10.023>
Reference: JCOMA 4812

To appear in: *Composites: Part A*

Received Date: 21 June 2017
Revised Date: 6 October 2017
Accepted Date: 22 October 2017

Please cite this article as: Sharma, S., Singh, B.P., Chauhan, S.S., Jyoti, J., Arya, A.K., S.R.Dhakate, Kumar, V., Yokozeki, T., Enhanced Thermomechanical and Electrical Properties of Multiwalled Carbon Nanotube Paper Reinforced Epoxy Laminar Composites, *Composites: Part A* (2017), doi: <https://doi.org/10.1016/j.compositesa.2017.10.023>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Enhanced Thermomechanical and Electrical Properties of Multiwalled Carbon Nanotube Paper Reinforced Epoxy Laminar Composites

Sushant Sharma^{1,2}, Bhanu Pratap Singh^{1,2*}, Sampat Singh Chauhan³, Jeevan Jyoti^{1,2}, Abhishek Kr. Arya¹, S.R.Dhakate¹, Vipin Kumar⁴, Tomohiro Yokozeki⁴

¹Advanced Carbon Products, CSIR-National Physical Laboratory,

Dr. K.S. Krishnan Marg, New Delhi-110012, India

²Academy of Scientific & Innovative Research (AcSIR)

³Centre for Polymer Science & Engineering, Indian Institute of Technology,

New Delhi-110016, India

⁴Department of Aeronautics and Astronautics, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo, 113-8656 Japan

Abstract

Thermomechanical and electrical properties of multiwalled carbon nanotubes (MWCNTs) bucky paper reinforced epoxy laminar composites have been studied. Incorporation of bucky paper in epoxy matrix led to improvement in thermomechanical properties but it reduced through-plane electrical conductivity. Therefore, 0.05 wt.% of MWCNTs is incorporated as secondary network in epoxy matrix to improve the electrical conductivity. The storage modulus for a 0.05 wt.% dispersed MWCNTs in epoxy resin impregnated 20 plies of bucky paper based composites (20Ply.05) was 4.84 GPa as compared to 2.24 GPa of pure epoxy. The glass transition temperature of 20Ply.05 laminar composite reaches to 191.6°C as compared to pure epoxy 168.5°C. The increment in electrical conductivity (792%) is reflected in improved electromagnetic shielding effectiveness (SE) over a wide frequency range of X & Ku band. The SE of more than ~ -50 dB for 20Ply.05 laminar composite in both the bands was obtained.

Keywords: Multiwalled carbon nanotubes (MWCNTs), Bucky paper, Dynamic mechanical analysis, Storage modulus (E'), Glass transition temperature (T_g), EMI shielding.

Download English Version:

<https://daneshyari.com/en/article/7889974>

Download Persian Version:

<https://daneshyari.com/article/7889974>

[Daneshyari.com](https://daneshyari.com)