

Accepted Manuscript

Creep behavior prediction of multi-layer graphene embedded glass fiber/epoxy composites using time-temperature superposition principle

Sohan Kumar Ghosh, Panasa Rajesh, Batna Srikavya, Dinesh Kumar Rathore, Rajesh Kumar Prusty, Bankim Chandra Ray

PII: S1359-835X(18)30039-3

DOI: <https://doi.org/10.1016/j.compositesa.2018.01.030>

Reference: JCOMA 4911

To appear in: *Composites: Part A*

Received Date: 15 August 2017

Revised Date: 23 January 2018

Accepted Date: 26 January 2018

Please cite this article as: Ghosh, S.K., Rajesh, P., Srikavya, B., Rathore, D.K., Prusty, R.K., Chandra Ray, B., Creep behavior prediction of multi-layer graphene embedded glass fiber/epoxy composites using time-temperature superposition principle, *Composites: Part A* (2018), doi: <https://doi.org/10.1016/j.compositesa.2018.01.030>

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.



**Creep behavior prediction of multi-layer graphene embedded glass fiber/epoxy
composites using time-temperature superposition principle**

Sohan Kumar Ghosh¹, Panasa Rajesh¹, Batna Srikavya¹, Dinesh Kumar Rathore^{1,2}, Rajesh Kumar Prusty^{1*}, Bankim Chandra Ray¹

¹Composite Materials Group, Department of Metallurgical and Materials Engineering,
National Institute of Technology, Rourkela, India-769008

²School of Mechanical Engineering, KIIT University, Bhubaneswar, India-751024

*Corresponding author's email id: prustyr@nitrkl.ac.in

Abstract

This article focuses on the prediction of the impact of multi-layer graphene (MLG) reinforcement on the mechanical performance of glass fiber/epoxy composites. Flexural tests have been performed at different temperatures (-196, 30, 70 and 110 °C). Composite with 0.1 wt.% MLG showed superior flexural performance at -196 °C, due to the generation of cryogenic clamping stress at the MLG/polymer interface. Long-term (upto one billion years) creep performance at relatively low temperature (30 °C) has been predicted using accelerated deformation at elevated temperatures and time-temperature superposition principle. It is revealed that MLG exhibits positive reinforcement efficiency even upto one billion years at 30 °C, after which it is negated and gradually becomes negative. However, this time span gets reduced at elevated temperatures due to the generation of unfavourable thermal stress at the MLG/polymer interface. Thermal characterization has also been conducted using Dynamic Mechanical Analysis, Thermo-gravimetric analysis and Differential Scanning Calorimetry.

Keywords: A. Graphene; A. Nanocomposites; B. Creep; B. Time-temperature superposition.

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات