

## Accepted Manuscript

Alumina reinforced nanofibers used for exceeding improvement in mechanical properties of the laminated carbon/epoxy composite

Ali Sharifi, Saied Nouri Khorasani, Sedigheh Borhani, Rasoul Esmaeely Neisiany

PII: S0167-8442(18)30100-9  
DOI: <https://doi.org/10.1016/j.tafmec.2018.05.001>  
Reference: TAFMEC 2040

To appear in: *Theoretical and Applied Fracture Mechanics*

Received Date: 27 February 2018  
Revised Date: 1 May 2018  
Accepted Date: 1 May 2018

Please cite this article as: A. Sharifi, S. Nouri Khorasani, S. Borhani, R. Esmaeely Neisiany, Alumina reinforced nanofibers used for exceeding improvement in mechanical properties of the laminated carbon/epoxy composite, *Theoretical and Applied Fracture Mechanics* (2018), doi: <https://doi.org/10.1016/j.tafmec.2018.05.001>

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.



## Alumina reinforced nanofibers used for exceeding improvement in mechanical properties of the laminated carbon/epoxy composite

Ali Sharifi<sup>a</sup>, Saied Nouri Khorasani<sup>a,\*</sup>, Sedigheh Borhani<sup>b</sup>, Rasoul Esmaeely Neisiany<sup>a,\*</sup>

<sup>a</sup> Department of Chemical Engineering, Isfahan University of Technology, Isfahan 84156-83111, Iran

<sup>b</sup> Department of Textile Engineering, Isfahan University of Technology, Isfahan 84156-83111, Iran

Corresponding authors' emails: [saied@cc.iut.ac.ir](mailto:saied@cc.iut.ac.ir), [r.esmaeely@ce.iut.a.ir](mailto:r.esmaeely@ce.iut.a.ir)

### Abstract

In the present research, mechanical properties of a conventional carbon/epoxy composite were improved via incorporating reinforced polyacrylonitrile (PAN) nanofibers between the carbon fabric layers. Alumina ( $\text{Al}_2\text{O}_3$ ) nanoparticles were employed to improve mechanical properties of the PAN nanofibers. Morphological studies of the nanofibers by scanning electron microscopy (SEM) showed increasing the alumina nanoparticles (more than 1 wt%) leading to nanoparticle agglomeration. However, the transmission electron microscopy (TEM) confirmed no alumina agglomeration occurred at 1 wt%, which the highest mechanical properties of the nanofibers was achieved for this nanoparticle content. Statistical analysis of the obtained both in-plane and out-of-plane mechanical properties on hybrid composites (carbon/epoxy composite containing nanofibers) showed that the composite reinforced with  $\text{Al}_2\text{O}_3$ -PAN nanofibers had greater mechanical properties rather than that of control composite (without the nanofibers) even the hybrid composite containing the same amount of neat PAN nanofibers.  $\text{Al}_2\text{O}_3$ -PAN nanofiber reinforced composite improved their neat PAN counterparts in tensile strength and flexural strength by 8 and 7 %, respectively. Furthermore, Compared to the control composite the

Download English Version:

<https://daneshyari.com/en/article/7196024>

Download Persian Version:

<https://daneshyari.com/article/7196024>

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