

# Accepted Manuscript

Electromagnetic shielding properties of graphene/acrylonitrile butadiene rubber nanocomposites for portable and flexible electronic devices

Ahmed A. Al-Ghamdi, Attieh A. Al-Ghamdi, Yusuf Al-Turki, F. Yakuphanoglu, Farid El-Tantawy



PII: S1359-8368(15)00678-2

DOI: [10.1016/j.compositesb.2015.11.010](https://doi.org/10.1016/j.compositesb.2015.11.010)

Reference: JCOMB 3884

To appear in: *Composites Part B*

Received Date: 27 September 2015

Revised Date: 3 November 2015

Accepted Date: 12 November 2015

Please cite this article as: Al-Ghamdi AA, Al-Ghamdi AA, Al-Turki Y, Yakuphanoglu F, El-Tantawy F, Electromagnetic shielding properties of graphene/acrylonitrile butadiene rubber nanocomposites for portable and flexible electronic devices, *Composites Part B* (2015), doi: [10.1016/j.compositesb.2015.11.010](https://doi.org/10.1016/j.compositesb.2015.11.010).

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.

# Electromagnetic shielding properties of graphene/acrylonitrile butadiene rubber nanocomposites for portable and flexible electronic devices

Ahmed A. Al-Ghamdi<sup>1</sup>, Attieh A. Al-Ghamdi<sup>2</sup>, Yusuf Al-Turki<sup>3</sup>,  
F. Yakuphanoglu<sup>1,4,5</sup>, Farid El-Tantawy<sup>2,6</sup>

<sup>1</sup> Department of Physics, Faculty of Science, King Abdulaziz University, Jeddah, Saudi Arabia.

<sup>2</sup> Center of Nanotechnology, King Abdulaziz University, Jeddah, Saudi Arabia

<sup>3</sup> Department of Electrical and Computer Engineering, King Abdulaziz University, Jeddah, Saudi Arabia

<sup>4</sup> Department of Physics, Faculty of Science, Firat University, Elazığ, Turkey

<sup>5</sup> Nanoscience and Nanotechnology Laboratory, Firat University, Elazığ, Turkey

<sup>6</sup> Department of Physics, Faculty of Science, Suez Canal University, Ismailia, Egypt

## Abstract

The modern advances in portable and flexible electronic devices require integration of flexibility into future electromagnetic interference shielding nanocomposites. Light weight and flexible acrylonitrile butadiene rubber/graphene nanosheets (NBR/GN) nanocomposites were fabricated using conventional rubber - roll milling technique. The surface morphology of as prepared GN and NBR/GN nanocomposites were examined by scanning and high resolution electron microscopy. The incorporation of GN nanosheets into NBR matrix has significantly enhanced the mechanical properties and electrical conductivity of nanocomposites. The dielectric properties of (NBR/GN) in the frequency range from 1 GHz to 12 GHz were studied. The electromagnetic interference shielding effectiveness (SE) of conducting NBR/GN nanocomposites was studied as a function of GN content, frequency and thickness of absorber and their interrelation was explored. We found an excellent agreement among theoretically predicted shielding effectiveness and the experimental data. The obtained results revealed that NBR/GN nanocomposites can be used as very effective, lightweight microwave shielding materials for spacecraft, aircraft, microelectronic and structural applications.

**Keywords:** A. Polymer-matrix composites (PMCs), B. Electrical properties

Corresponding author: fyhan@hotmail.com (F.Yakuphanoglu)

Tel:+90 424 2370000-3496

Fax:+904242330062

Download English Version:

<https://daneshyari.com/en/article/7212995>

Download Persian Version:

<https://daneshyari.com/article/7212995>

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