

## Accepted Manuscript

Vibration and bending behavior of functionally graded nanocomposite doubly-curved shallow shells reinforced by graphene nanoplatelets

Aiwen Wang, Hongyan Chen, Yuxin Hao, Wei Zhang

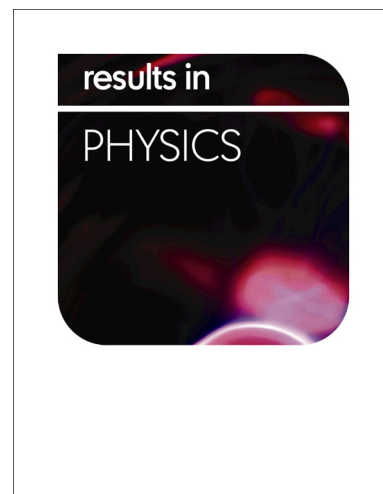
PII: S2211-3797(17)32435-X  
DOI: <https://doi.org/10.1016/j.rinp.2018.02.062>  
Reference: RINP 1294

To appear in: *Results in Physics*

Received Date: 13 December 2017  
Revised Date: 21 February 2018  
Accepted Date: 24 February 2018

Please cite this article as: Wang, A., Chen, H., Hao, Y., Zhang, W., Vibration and bending behavior of functionally graded nanocomposite doubly-curved shallow shells reinforced by graphene nanoplatelets, *Results in Physics* (2018), doi: <https://doi.org/10.1016/j.rinp.2018.02.062>

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.



# Vibration and bending behavior of functionally graded nanocomposite doubly-curved shallow shells reinforced by graphene nanoplatelets

Aiwen Wang<sup>1,2</sup>, Hongyan Chen<sup>2</sup>, Yuxin Hao<sup>3</sup>, Wei Zhang<sup>1\*</sup>

1. Department of Mechanic and Electronic Engineering, Beijing University of Technology, Beijing, 100022, China
2. School of Applied science, Beijing Information Science and Technology University, Beijing, 100192, China
3. Department of Mechanic and Electronic Engineering, Beijing Information Science and Technology University, Beijing, 100192, China

## ABSTRACT

Free vibration and static bending of functionally graded(FG) graphene nanoplatelet(GPL) reinforced composite doubly-curved shallow shells with three distinguished distributions are analyzed. Material properties with gradient variation in the thickness aspect are evaluated by the modified Halpin-Tsai model. Mathematical model of the simply supported doubly-curved shallow shells rests upon Hamilton Principle and a higher order shear deformation theory(HSDT). The free vibration frequencies and bending deflections are gained by taking into account Navier technique. The agreement between the obtained results and ANSYS as well as the prior results in the open literature verifies the accuracy of the theory in this article. Further, parametric studies are accomplished to highlight the significant influence of GPL distribution patterns and weight fraction, stratification number, dimensions of GPLs and shells on the mechanical behavior of the system.

**Key words:** Functional graded nanocomposite; Graphene nanoplatelets; Doubly-curved shallow shells; Mechanical behavior

Download English Version:

<https://daneshyari.com/en/article/8208250>

Download Persian Version:

<https://daneshyari.com/article/8208250>

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