Accepted Manuscript

Strain sensing behaviors of GnPs/epoxy sensor and health monitoring for composite materials under monotonic tensile and cyclic deformation

Shaowei Lu, Caijiao Tian, Xiaoqiang Wang, Lu Zhang, Kai Du, Keming Ma, Tao Xu

PII: S0266-3538(17)32057-2

DOI: 10.1016/j.compscitech.2018.02.017

Reference: CSTE 7093

To appear in: *Composites Science and Technology*

Received Date: 21 August 2017

Revised Date: 6 February 2018

Accepted Date: 11 February 2018

Please cite this article as: Lu S, Tian C, Wang X, Zhang L, Du K, Ma K, Xu T, Strain sensing behaviors of GnPs/epoxy sensor and health monitoring for composite materials under monotonic tensile and cyclic deformation, *Composites Science and Technology* (2018), doi: 10.1016/j.compscitech.2018.02.017.

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.

ACCEPTED MANUSCRIPT

Strain sensing behaviors of GnPs/epoxy sensor and health monitoring for composite materials under monotonic tensile and cyclic deformation

Shaowei Lu[a, *], Caijiao Tian [a], Xiaoqiang Wang [a], Lu Zhang [a], Kai Du [a], Keming Ma [a], Tao Xu [b],

[a] Faculty of Aerospace Engineering, Shenyang Aerospace University, Shenyang 110136, China

[b] Department of Control Engineering, Shenyang Aerospace University, Shenyang 110136, China

The graphene platelets (GnPs)/epoxy flexible sensor with controllable sensitivity and linearity can be used to monitor the deformation and damage of composite structures. The sensitivity and linearity can be regulated by dispersing different content of GnPs in epoxy and the dispersion was better improved by optimizing ultrasonic time and the ball mill mixing process. The GnPs/epoxy mixture exhibited relatively low percolation threshold of 0.76 vol. %. In this paper, GnPs/epoxy mixtures with GnPs loading of 0.84 vol.%, 1.05 vol. % and 1.58 vol. % were selected as damage detecting and strain sensor, and the characteristics of sensors were demonstrated via various mechanical tests. The monotonic tensile results suggest that there are three different linear change sensing stages, (1~0.2%), (0.2%~0.6%) and (0.6%~1.2%), the linear growth of the electrical response is softened while the linear tendency is enhanced due to increasing GnPs content, and it exhibits relatively high gauge factor of 11.81, 15.25 and 22.54 for 0.84 vol. %, 3.63, 8.13, 11.46 for 1.05 vol. %

Download English Version:

https://daneshyari.com/en/article/7214615

Download Persian Version:

https://daneshyari.com/article/7214615

Daneshyari.com