

Accepted Manuscript

Thermal conductivity and mechanical properties of flake graphite/copper composite with a boron carbide-boron nano-layer on graphite surface

H. Bai, C. Xue, J.L. Lyu, J. Li, G.X. Chen, J.H. Yu, C.T. Lin, D.J. Lv, L.M. Xiong

PII: S1359-835X(17)30425-6

DOI: <https://doi.org/10.1016/j.compositesa.2017.11.019>

Reference: JCOMA 4840

To appear in: *Composites: Part A*

Received Date: 12 July 2017

Revised Date: 22 November 2017

Accepted Date: 23 November 2017



Please cite this article as: Bai, H., Xue, C., Lyu, J.L., Li, J., Chen, G.X., Yu, J.H., Lin, C.T., Lv, D.J., Xiong, L.M., Thermal conductivity and mechanical properties of flake graphite/copper composite with a boron carbide-boron nano-layer on graphite surface, *Composites: Part A* (2017), doi: <https://doi.org/10.1016/j.compositesa.2017.11.019>

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.

Thermal conductivity and mechanical properties of flake graphite/copper composite with a boron carbide-boron nano-layer on graphite surface

H Bai^{1,2}, C Xue^{2*}, JL Lyu², J Li³, GX Chen², JH Yu², CT Lin², DJ Lv¹, LM Xiong^{1*}

¹State Key Laboratory of Optical Fiber and Cable Manufacture Technology, Yangtze Optical Fibre and Cable Joint Stock Limited Company, China, Wuhan 4300

²Key Laboratory of Marine Materials and Related Technologies, Zhejiang Key Laboratory of Marine Materials and Protective Technologies, Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences, Ningbo 315201, P.R. China

³Beijing Institute of spacecraft system engineering, 100094, P.R. China

Abstract

Graphite/copper composites had attracted significant recent attention for thermal management applications due to their superior thermal properties, low cost and ease of machining. However, achieving the enhancement of mechanical properties of composites with high thermal conductivity remained challenging. In this study, graphite/copper composites had been produced by vacuum hot pressing process, in which the boron carbide-boron coating was synthesized on graphite to improve the mechanical properties of copper matrix composites with high volume fraction of graphite. The resulting composites had superior thermal conductivity (676W/mK, 180% of copper) and apposite coefficient of thermal expansion (7.1ppm/K), which was attributed to the homogeneous dispersion and well-controlled alignment of graphite in the composite. And the results showed that the coating on graphite slightly decreased the thermal conductivity and coefficient of thermal expansion of the composites, but evidently improved the bending strength. The flexural strength raised to 74MPa, 42% increased with that of uncoated composite.

Keywords: Metal-matrix composites ; Surface treatments ; Thermal properties

* Corresponding authors

Fax: +86 0574 8668 5165

E-mail address: hustnimteyofc@sina.com, xiongliangming@yofc.com

1. Introduction

Heat sink elements in multi-functional electronic packaging systems are

Download English Version:

<https://daneshyari.com/en/article/7889660>

Download Persian Version:

<https://daneshyari.com/article/7889660>

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