

Accepted Manuscript

Coating of poly(carborane-carbosilane-phenylacetylene) on carbon fibers with excellent oxidation protection



Dejin Tong, Haipeng Wang, Lei Wang, Lei Chen, Zhanxiong Li

PII: S0257-8972(17)30359-6
DOI: doi: [10.1016/j.surfcoat.2017.04.014](https://doi.org/10.1016/j.surfcoat.2017.04.014)
Reference: SCT 22257
To appear in: *Surface & Coatings Technology*
Received date: 27 January 2017
Revised date: 7 April 2017
Accepted date: 7 April 2017

Please cite this article as: Dejin Tong, Haipeng Wang, Lei Wang, Lei Chen, Zhanxiong Li, Coating of poly(carborane-carbosilane-phenylacetylene) on carbon fibers with excellent oxidation protection. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. *Sct*(2017), doi: [10.1016/j.surfcoat.2017.04.014](https://doi.org/10.1016/j.surfcoat.2017.04.014)

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.

Coating of poly(carborane-carbosilane-phenylacetylene) on carbon fibers with excellent oxidation protection

Dejin Tong^a, Haipeng Wang^a, Lei Wang^a, Lei Chen^a, Zhanxiong Li^{a,b,*}

^aCollege of Textile and Clothing Engineering, Soochow University, Suzhou 215021, China.

^bNational Engineering Laboratory for Modern Silk, Suzhou 215123, China

Abstract: Linear carborane-carbosilane-phenylacetylene co-polymer has been synthesized as precursor for thermosets and ceramics for the protection of carbon fibers from oxidation in an oxidizing environment. The novel linear co-polymers can be processed conveniently and converted into thermoset or ceramics since they are either liquids or low melting solids at room temperature and are soluble in most organic solvents. Treatment of carbon fibers with poly(carborane-carbosilane-phenylacetylene) by precursor infiltration and pyrolysis (PIP) process can provide a protective barrier at elevated temperatures. Tensile strength measurement revealed that the coated carbon fiber maintained 81.39% of its original strength. It was found that the novel co-polymer is highly efficient in protecting the carbon fibers from oxidation breakdown when used as a matrix material (ceramic). Boron and $-C\equiv C-$ group appear to be the key to the unique oxidative stability of the composite compositions. The derived ceramic coatings on carbon fibers were characterized by scanning electron microscopy (SEM) and energy dispersive spectroscopy (EDS). Anti-oxidation studies were performed by thermogravimetric analyses (TGA). The results showed that the oxidation resistance of carbon fibers has been promoted obviously by the ceramic coatings.

Keywords: Oxidation resistance; Coating; Micro-structure; Carbon fibers

1. Introduction

Materials used in the advanced aero and space applications, such as turbine

* Corresponding author at: College of Textile and Clothing Engineering, Soochow University, No. 199 Renai Road, Industry Park, Suzhou 215021, China.

Tel: +86-512-67061190; Fax: +86-512-67246786.

E-mail address: lizhanxiong@suda.edu.cn (Z. X. Li).

Download English Version:

<https://daneshyari.com/en/article/5465400>

Download Persian Version:

<https://daneshyari.com/article/5465400>

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