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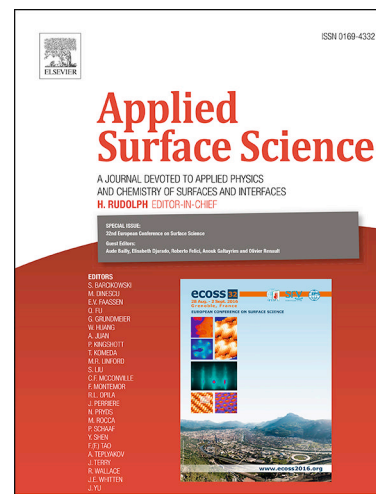
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Interfacial enhancement of carbon fiber/nylon 12 composites by grafting nylon 6 to the surface of carbon fiber

Chen Hui^a, Cai Qingyu^{b*}, Wu Jing^a, Xia Xiaohong^a, Liu Hongbo^{a*}, Luo Zhanjun^a

^a College of Material Science and Engineering, Hunan University, Hunan Changsha, 410082, PR China

^b College of Mechanical and Vehicle Engineering, Hunan University, Hunan Changsha, 410082, PR China

Abstract: Nylon 6 (PA6) grafted onto carbon fiber (CF) after chemical oxidation treatment was in an attempt to reinforce the mechanical properties of carbon fiber composites. Scanning electronic microscopy (SEM), Fourier transform infrared analysis (FT-IR), X-ray photoelectron spectroscopy (XPS) and thermogravimetric analysis (TG) were selected to characterize carbon fibers with different surface treated. Experimental results showed that PA6 was grafted uniformly on the fiber surface through the anionic polymerization. A large number of functional groups were introduced to the fiber surface and the surface roughness was increased. After grafting PA6 on the oxidized carbon fibers, it played an important role on improving the interfacial adhesion between the fibers and the matrix by improving PA12 wettability, increasing chemical bonding and mechanical interlocking. Compared with the desized CF composites, the tensile strength of PA6-CF/PA12 composites was increased by 30.8% from 53.9 MPa to 70.2 MPa. All results indicated that grafting PA6 onto carbon fiber surface was an effective method to enhance the mechanical strength of carbon fiber/nylon 12 composites.

Keywords: Carbon fiber; Chemical grafting; Nylon 6; Nylon 12; Composites

1. Introduction

Carbon fibers (CF) and its composite materials have been widely used as structural materials and functional materials in the field of aerospace, sports leisure products, automobile, wind power blades

The first corresponding author is Cai Qingyub*, E-mail address: 13875982232@163.com
the second corresponding author is Liu Hongboa*, E-mail address: hndxlhb@163.com

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