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Polyethersulfone melt-spun fibers plasticized with epoxy oligomer

Jinli Zhou^a, Chao Cheng^a, Minqiang Jiang^a, Shu Zhu^{b,c}, Zeyu Sun^{b,c}, Yong Liu^{a,c}, Hui Zhang^{a,c*} and Muhuo Yu^{a,b,c}

^a State Key Laboratory for Modification of Chemical Fibers and Polymer Materials,

College of Materials Science and Engineering, Donghua University, Shanghai, 201620, China;

^b Center for Civil Aviation Composites, Shanghai, 201620, China.

^c Shanghai Key Laboratory of Lightweight Structural Composites, Shanghai, 201620, China.

*Corresponding author: Tel: +86 21-67874266; fax: +86 21 67874256. E-mail address: marcozh@sinac.com

ABSTRACT

In order to prepare Polyethersulfone (PES) melt-spun fibers, epoxy (EP) oligomer was adopted as a novel plasticizer. The plasticization of EP on PES was investigated by differential scanning calorimetry (DSC), fourier transform infrared (FTIR), and rheological techniques. The results revealed that the glass transition temperature (T_g), the complex viscosity (η^*), and melt processing temperature (T_{mp}) of PES/EP blends decreased significantly with the increase of EP content. FTIR spectroscopy and rheological behavior demonstrated no signs of crosslinking reactions occurring between PES and EP molecules. Finally, PES melt-spun fibers were successfully obtained taking EP as a plasticizer, showing the highest tensile strength at 2.71 cN/dtex. The morphologies of the fibers observed by scanning electron microscopy (SEM) presented smooth and uniform surface, and compact fracture.

Key words: Polyethersulfone; Epoxy oligomer; Plasticization; Melt spinning; Fiber technology; Amorphous materials

1 Introduction

PES, as a high-performance, amorphous, engineering thermoplastic, possesses high

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