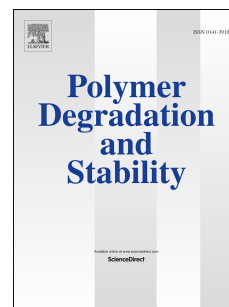


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Biobased multiblock copolymers: Synthesis, properties and shape memory performance of poly(ethylene 2,5-furandicarboxylate)-b-poly(ethylene glycol)

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Abstract: A series of multiblock copolymer poly(ethylene 2,5-furandicarboxylate)-poly(ethylene glycol) (PEFEGs) were synthesized from available biobased ethylene glycol (EG), 2,5-furandicarboxylic acid (FDCA), and poly(ethylene glycol) (PEG) through a two-step melt polycondensation method. The composition, molecular weight and its distribution, crystallization behavior, thermal stability of PEFEGs were investigated by ^1H NMR, GPC, DSC, and TGA, respectively. Effects of composition on crystallization behavior, thermal and mechanical properties of PEFEGs were investigated. Furthermore, shape memory properties of PEFEGs were also investigated systematically. GPC and ^1H NMR results show that the products were the multiblock copolymers, not the blend of PEG and PEF. All PEFEGs exhibited the excellent thermal stability. With the increase of PEG chain length and content, melt crystallization peak and melt peak of PEG block became higher and the enthalpy values also became higher. Compared with PEF, the elongation at break of PEFEGs are much better. Meanwhile, PEFEGs exhibit excellent shape memory properties.

Keywords: Poly(ethylene 2,5-furandicarboxylate), 2,5-furandicarboxylic acid, poly(ethylene glycol), biobased polyester, shape memory

1. Introduction

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