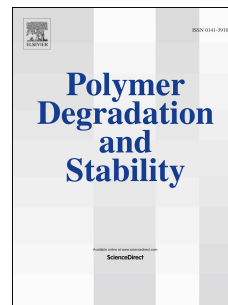


# Accepted Manuscript

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**Poly(hexamethylene 2,5-furandicarboxylate) copolyesters containing phosphorus: Synthesis, crystallization behavior, thermal, mechanical and flame retardant properties**

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**ABSTRACT**

A series of phosphorus-containing poly(hexamethylene 2,5-furandicarboxylate)s (PHFCs) were synthesized from available biobased 2,5-furandicarboxylic acid (FDCA), 1,6-hexanediol (HDO), and 2-carboxyethyl(phenyl)phosphinic acid (CEPPA). Microstructure, molecular weight and its distribution, crystallization behavior, thermal, mechanical and flame retardant properties were characterized. Moreover, the effects of composition on various properties were investigated systematically. All PHFCs exhibited the excellent thermal stability. Glass transition temperature of PHFC slightly decreased with the increasing of CEPPA. Furthermore, nano-TiO<sub>2</sub> not only improved the molten drops phenomenon, but also increased the crystallization rate. The limiting oxygen index of PHFC with 10 mol% CEPPA and 1 wt% TiO<sub>2</sub> was 26% and UL94V-0 rating was obtained.

*Keywords:* Poly(hexylene 2,5-furandicarboxylate), 2,5-furandicarboxylic acid, biobased polyester, flame retardance, 2-carboxyethyl(phenyl)phosphinic acid

**1. Introduction**

Biobased polymers have gained more attention due to environmental attention in the last decades, such as polylactic acid (PLA) [1-4], poly(ethylene-2,5-furandicarboxylate) (PEF) [5-7], poly(butylene

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