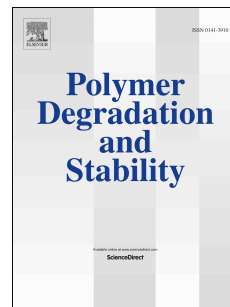


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Célia Badji, Joana Beigbeder, Hélène Garay, Anne Bergeret, Jean-Charles Bénézet, Valérie Desauziers



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Célia Badji, Joana Beigbeder, H  l  ne Garay, Anne Bergeret, Jean-Charles B  n  zet and Val  rie Desauziers

C2MA, Ecole des mines d'Al  s, 6 avenue de Clavi  res, 30319 Cedex France

Corresponding author : Anne.Bergeret@mines-ales.fr

Abstract

The degradation behaviors of hemp fibers reinforced PP biocomposites under outdoor and artificial weathering were compared to establish a correlation. For this purpose, several measurements were performed throughout the expositions. Mechanical performance was tested by three-point bending test. Microstructure and chemical composition changes were also assessed. Otherwise, visual aspect and topography were determined. The artificial weathering effectively accelerated the degradation mechanisms. Oxidation pathways and surface aspect alteration of both polymer and biocomposites occurred faster. However, whereas biocomposites were mainly subjected to outdoor conditions due to high sensitivity of hemp fibers, neat PP was globally mostly affected by laboratory chamber conditions. Its oxidation rate largely outstripped reinforced materials ones. Principal Component Analysis was used for verifying the differences of variables correlations profiles between artificial and exterior ageing dataset in order to compare the degradation mechanisms. Through the statistical analysis, some attempts were made to find equivalence between artificial and outdoor weathering times thanks to properties degradation rate similarities.

Keywords: accelerated ageing, natural ageing, statistical method, hemp fibers, temporal equivalence

1. Introduction

Environmental and production aspect benefits of natural fibers encourage research and industries to develop bio-based materials. Among them, hemp fibers have long been valued for their high strength, and were besides extensively employed in the fabrication of ropes, sails and textiles [1]. Nowadays they are also used as a substitute for glass, carbon or

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