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ACCEPTED MANUSCRIPT

REPROCESSING OF ARTIFICIAL UV-WEATHERED WOOD FLOUR REINFORCED POLYPROPYLENE COMPOSITES

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ABSTRACT

This work aims to determine and understand the influence of UV weathering on the reprocessing of a wood-plastic composite (WPC), i.e. of a wood flour reinforced polypropylene (PP) composites. Two wood flour contents (10% w/w and 30% w/w) were studied in comparison with neat PP. Compounds were produced by twin-screw extrusion. Then, ISO1A "dog bone" samples were obtained by injection molding and exposed to an artificial UV weathering using a xenon arc climatic chamber in order to simulate a long-term outdoor exposure. After this weathering stage, photo-degraded samples were submitted to grinding and injection cycles and characterized through different experimental technics. The visual evolution of the surface was followed by optical microscopy and scanning electron microscopy. In order to understand the material physical degradation, the mechanical behavior was measured thanks to tensile, Charpy impact and DMTA (Dynamic Mechanical Thermal Analysis) tests. The assessment of the microstructural evolution was performed by differential scanning calorimetry (crystallinity ratio), size exclusion chromatography (average molecular weights) tests and infrared spectroscopy (chemical structure). Additional rheological tests assessed assumptions on degradation mechanisms.

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