

## HYBRID POLYMER COMPOSITES WITH WOOD AND GRAPHITE FILLERS

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The purpose of the research was to produce hybrid composite materials based on non-immiscible polymers recyclates and determine the simultaneous effect of wood flour and graphite on the obtained materials.

The matrix of polymer composites was a mixture of recyclates of two commonly used polymers: polyethylene (PE) and poly(vinyl chloride) with a variable concentration of PVC: 0, 5, 10, 90, 95, and 100 wt%. 30 wt% of previously dried wood flour (WF) and 10 wt% graphite (G) were incorporated into each mixture of recyclates. Composites were obtained by extrusion with a laboratory single-screw extruder at a head temperature of 190 °C. After extrusion, the ground composites material were pressed into form of plates ( 4 x 100 x 100 mm and 2 x 100 x100 mm) from which the test specimens were cut out using milling plotter.

The processing properties of composites were tested by determination of mass flow index. Additionally, mechanical properties at static tension and Vicat's softening temperature was examined. The thermal stability by TGA method and the flammability of the composites with a test flame of 50 W with horizontal and vertical alignment of the sample was also determined.

Wood polymer composites (WPC) containing 10 wt% of graphite were characterized by better flammability resistance compared to composites without graphite, regardless of the composition of the PVC/PE matrix.

Composites of PVC/PE/WF/G are different from unfilled materials due to reduced mechanical and thermal properties. However, the achieved results of the research do not exclude the possibility of using such type of composites and indicate that their production may be an alternative way of reusing of mixture of completely immiscible polymers.

The developed hybrid composite of immiscible recyclates can be used as biodegradable elements in multilayer materials with damping and non-flammable properties.