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EXPERIMENTAL STUDY ON EFFECT OF MATRIX MELT FLOW BEHAVIOR ON RECYCLING WOOD-HDPE COMPOSITES

Majid TabkhPaz Sarabi, Amir Hosein Behravesh, Peyman Shahi, Abbas Zolfaghari,

Mechanical Engineering, Tarbiat Modares University

**Corresponding author: majidtabkhpaz@yahoo.com*

This paper presents an experimental investigation on the effect of matrix melt flow rate on the properties of the recycled wood-plastic composites (WPC) produced in an extrusion process. WPCs consist of wood particles and a thermoplastic matrix such as PE, PP and PVC. High density polyethylene (HDPE) is a favorite polymeric matrix when the processing temperature can be maintained low to avoid wood burning. Various grades of HDPE with different melt flow indexes (MFI) are available by the suppliers. The aim of this study was to understand the role of matrix MFI on the recycling ability of WPCs produced via an extrusion process. Three grades of HDPE, low, middle and high MFI, respectively named as LMFI, MMFI and HMFI (0.45, 7 and 20 gr/10min), were used to produce rod shaped profiles of WPC with 60 wt% wood content. The mechanical properties were obtained from bending test and physical properties carried out from water absorption and density measurement tests. For recycling process, produced WPC profiles were grounded and utilized as wood-plastic granules. Based on results, recycled WPC with HMFI indicates poorer properties in comparison to those of non-recycled type. Results also indicate a low drop in mechanical and physical properties of recycled composites produced by MMFI and HMFI HDPE. On the other hand, producing profiles with HMFI HDPE as polymeric matrix presents higher flow rate from processing point of view.