

PLA/PHA BIO-BASED BLENDS FOR INJECTION MOLDING AND 3D PRINTING PROCESS

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The present study includes preparation and characterization of bio-based poly (lactic) acid/ polyhydroxyalkanoate (PLA/PHA) blends suitable for injection molding and fused layer modelling (FLM) processes. PLA and PHA polymers were previously melt blended in twin screw extruder with blending ratio 80/20. PLA used as a matrix polymer in this study as well as its blends with amorphous copolymer PHA were further produced by two processing methods, injection molding and 3D printing. PLA and PLA/PHA injection molded and 3D printed parts were produced according to the standard ISO 294-1. Small and wide angle X-ray measurements were performed in order to study the influence of the crystal morphology on the mechanics of PLA and PLA/PHA 3D printed as well as injection molded parts.

This work aims to show that by blending PLA with other bio-based materials e.g. amorphous copolymer PHAs, it is possible to adjust and improve mechanical properties of printed PLA parts. Particularly, notched impact strength values of PLA/PHA_3D printed parts are increased by 90 % compared to pure PLA and even achieved higher values compared to their injection moulded counter parts.

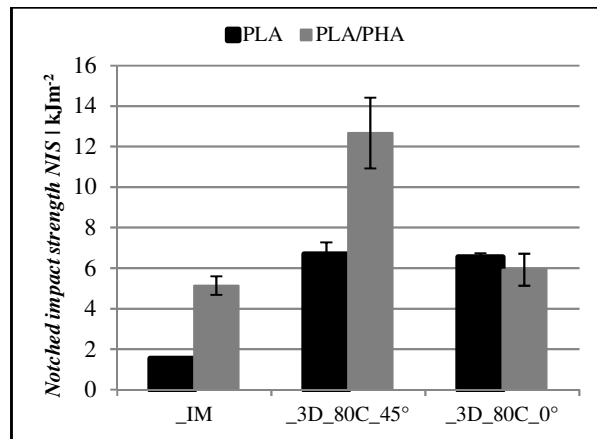


Figure 1 Measured notched impact strength value of PLA and PLA/PHA 3D printed and injection molding parts

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