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Enhancement of mechanical and thermal properties of Poly (Lactic Acid)/ Poly (Ethylene-Co-Glycidyle Methacrylate) / hexagonal boron nitride blend-composites through electron-beam irradiation

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The main objective of this work is to determine the influence of electron beam irradiation on thermal and mechanical properties of most promising bio-based and biodegradable Poly (lactic acid) (PLA) based blend-composites. The PLA/PEGM blend is prepared, to reduce the brittleness and improve the toughness of PLA, by using twin-screw Micro compounder. However, the heat deflection temperature (HDT) and other tensile properties were reduced. The HBN has been incorporated as part per hundred i.e. 5 phr and 10phr to improve the HDT of prepared blend. The prepared specimens of blend and blend-composites were irradiated to high energy (4.5 MeV) electron beam (E-beam) at different radiation doses to introduce the cross linking among the polymer chains and uniform dispersion of HBN particles in the PLA/PEGM/HBN blend-composites. The further improvements in the notched impact strength and HDT have been achieved in the case of PLA/PEGM/HBN blend-composites. The irradiated PLA/PEGM/HBN 5phr blend composite shows high notched impact strength and HDT as compared to other Unirradiated and E-beam irradiated blend and blend-composites. The improvements in the yield strength and tensile modulus have also been noticed in case of E-beam irradiated PLA/PEGM/HBN blend-composites as compared to Unirradiated blend-composites.

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