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Title: DYNAMIC MECHANICAL AND WATER ABSORPTION PROPERTIES OF MICROCRYSTALLINE CELLULOSE REINFORCED POLYPROPYLENE COMPOSITES: THE EFFECT OF UNCONVENTIONAL IRRADIATION ROUTE

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Abstract: The unconventional electron beam (EB) irradiation route in preparing microcrystalline cellulose (MCC) fiber reinforced recycled polypropylene (rPP) composites was studied. In this route, the rPP was first subjected to EB irradiation at various doses (10-50kGy) and was then used as a compatibilizer. Unirradiated and irradiated rPPs were blended at two different ratios (90:10; 50:50) and added with MCC at contents of 5, 20 and 40wt%. Dynamic mechanical analysis (DMA) and water absorption tests were carried out. The DMA spectra exhibited high stiffness and damping behaviour. As the content of MCC increased, the water resistance of composites dropped slightly as compared to the controlled rPP. However, some compositions (50:50/40MCC-10kGy and 50:50/5MCC-50kGy) had shown opposite results. The improvement in the studied properties proved the existence of the compatibility effect that occurred at low irradiation doses, and also depended on the ratio (unirradiated and irradiated rPP) and MCC contents.

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