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## Effects of Irradiated Recycled Polypropylene Compatibilizer on the Mechanical Properties of Microcrystalline Cellulose Reinforced Recycled Polypropylene Composites (Conference Paper)

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### Abstract

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In this study, the potential of irradiated recycled polypropylene (i-rPP), as compatibilizer for rPP reinforced with microcrystalline cellulose (MCC) composites, is evaluated. RPP/MCC composites, with various MCC loadings (5, 20 and 40 wt%) are compounded with melt extrusion, followed by injection moulding. Before compounding, the rPP is exposed to an electron beam irradiation at different doses (10, 20, 30 and 50kGy) and then unirradiated rPP is added at a ratio of 90:10. The mechanical properties of the composites are analyzed using tensile and flexural tests. Both mechanical properties were improved as a result of increased irradiation doses and MCC loadings. However, the optimum results of tensile and flexural properties were obtained at different irradiation doses and MCC loadings. Examination of the fracture surface using Field Emission Scanning Microscopy (FESEM) reveals the presence of good adhesion bonding between rPP matrix and MCC fibre. Gel content analysis exhibits a higher degree of crosslinking with increasing irradiation doses. The occurrence of crosslinking appears to improve the surface adhesion of MCC fibres in the rPP matrix and leads to improved mechanical properties of the composites. © 2017 The Authors.

### Author keywords

irradiation microcrystalline cellulose (MCC) morphology Recycled Polypropylene (rPP) surface adhesion tensile properties

### Indexed keywords

Engineering controlled terms:

Adhesion Cellulose Crystalline materials Injection molding Irradiation Mechanical properties Melt spinning Morphology Polypropylenes Recycling Reinforced plastics Reinforcement Tensile properties Tensile strength

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