

Surface modification of magnesium oxysulfate whisker (MOSw)/polymer composites

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Magnesium oxysulfate whisker (MOSw) is a promising reinforcing whisker in varying industry due to large aspect ratio and low bulk density. The compatibility of MOSw with organic polymers is a key issue in the practical application which determines the mechanical performance and long-term durability of its composite parts. In this study, MOSw was treated by silane coupling agent (3-methacryloyloxypropyl-trimethoxy silane, MPS) to improve the interfacial compatibility between the hydrophilic MOSw and the hydrophobic polymer matrix. Si ratio of MOSw before and after surface modification was 0.028 % and 0.267 % respectively which was investigated by X-ray fluorescence (XRF). The tensile strength was increased from 24.8 MPa of pristine PP to 37.4 MPa (about 51% increase) by the addition of 30 wt% of MPS-MOSw. The tensile modulus was increased from 1,210 MPa of pristine PP to 4,290 MPa (about 255% increase) by the addition of 30 wt% of MPS-MOSw.