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Compatibilization of polypropylene fibers in epoxy based GFRP/clay nanocomposites for improved impact strength

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ABSTRACT

In the present work, glass fiber reinforced polymer (GFRP) nanocomposites containing polypropylene fibers as a reinforcement were prepared for the first time. Nanocomposites containing 1phr nanoclay and 1–3 phr polypropylene fibers were fabricated to improve the impact strength of the brittle GFRPs. In addition to impact strength, tensile and flexural properties were also investigated. Polypropylene fibers were used as a reinforcement in the as-received form and also after their compatibilization by two different methods viz. silanization, and ultra-violet assisted maleic anhydride grafting. Fourier transform infrared spectroscopy and energy dispersive spectroscopy of the treated polypropylene fibers were studied to confirm the treatment of fibers. Scanning electron microscopy of fractured impact specimens was conducted to evaluate the interfacial bonding between matrix and reinforcement in composites. Transmission electron microscopy was conducted to ascertain