

Effect of poly (methyl methacrylate) modified water hyacinth fiber on properties of low density polyethylene/natural rubber/water hyacinth fiber composites

Abstract

The effect of poly(methyl methacrylate) modified water hyacinth fiber on properties of low density polyethylene (LDPE)/natural rubber (NR)/water hyacinth fiber (WHF) composites were investigated. The composites were prepared with Z-blade mixer at 180°C and rotor speed of 50 rpm. The poly(methyl methacrylate) modified water hyacinth fibers in LDPE/NR composites (LDPE/NR/WHF-_{PMMA}) gave a greater value of tensile strength, Young's modulus, glass transition temperature (T_g), melting temperature (T_m), and % crystallinity compared to unmodified water hyacinth fibers in LDPE/NR composites (LDPE/NR/WHF). FTIR analysis shows the presence of ester carbonyl group and C-O ester group in poly (methyl methacrylate) modified water hyacinth fiber. The SEM micrograph also shows a better interfacial adhesion between the fibers and LDPE/NR matrixes for LDPE/NR/WHF-_{PMMA} composites than LDPE/NR/WHF composites. LDPE/NR/WHF-_{PMMA} composites had a lower value of interparticle spacing compared to LDPE/NR/WHF composites that enhanced the interparticle interaction between fiber and LDPE/NR matrixes.