

Surface modification of magnesium hydroxide nanoparticles with hexylphosphoric acid to improve thermal stabilities of polyethylene composites

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Magnesium hydroxide (MH) has been identified as an alternative flame retardant for polyethylenes (PEs), to replace halogen-based flame retardants, which cause severe environmental problems. However, the use of MH in fabricating composites with PEs is limited because a high loading ratio is required for adequate flame suppression and because the hydrophilic surfaces of microparticulate MH cause aggregation in hydrophobic, highly crystalline PEs. To overcome these issues, we modified the surfaces of MH nanoparticles using hexylphosphoric acid to obtain hydrophobic surfaces. The surface-modified MH nanoparticles enhanced the thermal stabilities of PE composites, even at a low loading ratio of below 30 wt%.