

Surface modification of Magnesium Hydroxide nanoparticles with hexyl phosphate to improve thermal stability and flame retardancy in Polyethylene composite

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Magnesium hydroxide (MH) has been highlighted as an alternative flame retardant for the polymer materials, replacing halogen-based flame retardants which cause severe environment problems. However, the use of MH has been limited because a high loading ratio is required for adequate suppressing effect on flame and because hydrophilic surfaces of microparticulate MH cause aggregation in hydrophobic polymer composites. To overcome these issues, we modified the surface of MH nanoparticles using alkyl phosphoric acid to obtain hydrophobic surface. Polyethylene composites were prepared by dispersing the modified MH nanoparticles in polyethylene and their thermal, mechanical stabilities and flame retardancy were examined. It was demonstrated that the surface modified MH nanoparticles had enhanced flame retardancy at a low load ratio in polyethylene while reducing the loss in mechanical strength. (This work was funded by the Korea Research Foundation (2013R1A1A2058816))