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Layered double hydroxide derivatives as flame retardants for flexible PVC

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Abstract

The use of layered double hydroxide (LDH) derivatives as flame retardants for PVC, plasticized with 100 phr diisononyl phthalate (DINP), was investigated. Cone calorimeter results, obtained at a radiant flux of 35 kW m(sup-2), revealed that adding 30 phr conventional magnesium-aluminium LDH lowered the peak heat release (pHRR) rate from 623 ±8 kW m(sup-2) to 389 ±9 kW m(sup-2) and reduced the smoke release by 37%. Partial replacement of the aluminium with iron resulted in a red pigmented additive that was more effective as a flame retardant reducing the pHRR to as little as 253 ± 5 kW m(sup-2). This additive also showed better smoke suppression (44% lower) but the best smoke suppression was achieved by replacing part of the magnesium with copper (49% lower).