# Flame retardancy of ethylene vinyl acetate (EVA) using new aluminum-based fillers

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## ABSTRACT

Flame retardancy of EVA copolymers using three new synthesized and two commercial hydrated mineral aluminum-based fillers having different shape factor was studied. It was shown that the peak of heat release rate (pHRR) in cone calorimeter test significantly decreased in presence of lamellar-shaped pseudoboehmites compared to that observed in presence of aluminum trihydroxyde and boehmite. On the opposite, thermogravimetric analysis (TGA) and Pyrolysis Combustion Flow Calorimeter analysis (PCFC) did not show any significant modification between the five formulations indicating that the pHRR decrease is related to barrier effect and not to endothermic effect or to improvement of thermal stability. No relationship was found between the pHRR decrease and the melt viscosity. ESEM and EDX analyses have confirmed that the efficiency of the barrier effect in presence of the two lamellar pseudoboehmites is assigned to migration phenomena of particles which led to the quick formation of a homogeneous and cohesive insulating layer. This study has clearly demonstrated that the flame retardancy of EVA could be significantly enhanced using new lamellar-shaped pseudoboehmites resulting in rapid fillers migration accompanied with the formation of a stable superficial layer resistant to polymer softening.