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THE EFFECT OF MONTMORILLONITE CLAY AND FIRE RETARDANTS ON THE HEAT OF COMBUSTION OF RECYCLED ACRYLONITRILE-BUTADIENE STYRENE

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Abstract

The combustion behavior of several polymers was studied with a cone calorimeter, while the samples were based on a recycled acrylonitrile-butadiene styrene (ABS) and as additives were considered: organic montmorillonite (OMT) and a mixture of two fire retardants (FR).
The samples structure and thermal properties are characterized by means of Scanning electron microscopy (SEM), X-ray Powder Diffraction (XRD) and Energy-dispersive X-ray spectroscopy (EDX) and cone calorimeter. The main objective of this article is to study the effect of OMT and FR adding into a recycled ABS combustion behavior. Results show that the addition of the fire retardants into the reABS+OMT matrix created a relevant effect on the phase morphology of the samples while the nanocomposite and fire retardant improve the thermal stability of reABS matrix, as measured by cone calorimeter. If it refers to peak heat release rate (PHRR), one can see a reduction in PHRR when FR and OMT are added to the reABS matrix. More precisely, the PHRR decrease is about 263% if 1%OMT and 18% FR are added to the samples. The sole addition of clay in polymers decreases significantly the peak heat release rate, while FR addition plays a relevant role.

Key words: acrylonitrile butadiene styrene (ABS), effective heat of combustion, fire retardant, mass loss, montmorillonite

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