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## A novel processing method namely fast evaporation mixing to prepare fluoroelastomer/montmorillonite composites

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**ABSTRACT:** Fluoroelastomer (FKM)/montmorillonite (MMT) nanocomposites were prepared by fast evaporation mixing and melting mixing, respectively. The mechanical properties and curing behaviors of the nanocomposites prepared by the two methods were compared. The nanocomposites were characterized by X-ray diffraction (XRD), field-emission scanning electron microscopy (FESEM), transmission electron microscopy (TEM), rubber processing analysis (RPA), thermal gravity analysis (TGA) and dynamic mechanical analysis (DMA). The results indicate that the nanocomposites that were prepared by fast evaporation mixing show better mechanical properties than those prepared by melting mixing according to the increase of the MMT contents from 0.5 to 2.5 phr. When the MMT content was 2.5 phr, exfoliated MMT platelets were found to disperse uniformly in the FKM matrix and the nanocomposites possessed a higher  $\tan\delta_{\max}$  and weaker Payne effect. By contrast, some aggregated MMT appeared in the matrix by melting mixing, which led to a lower  $\tan\delta_{\max}$  and stronger Payne effect. Therefore, fast evaporation mixing is an eco-friendly and simple processing technology that can be used to realize a good dispersion of nano-fillers in a rubber matrix.

**Keywords:** Fluoroelastomer, montmorillonite, nanocomposite, fast evaporation mixing, melting mixing

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