AKRON RUBBER DEVELOPMENT LABORATORY, INC.

Processing-Structure Relationships in Polypropylene/EPDM Thermoplastic Elastomer Nanocomposites

Abstract

Thermoplastic elastomers have been extensively studied and have gained wide acceptance because of their rubber-like properties, recyclability and thermoplastic processability. Thermoplastic vulcanizates (TPV's) are a class of high performance thermoplastic elastomers that are prepared by melt blending, in which the rubber phase is selectively crosslinked resulting in the rubber phase being rendered non-flowable and dispersed in the continuous thermoplastic matrix. Polymer / layered silicate nanocomposites of various types have similarly received much attention as promising high performance materials. Combining these two complementary technologies to form a TPV nanocomposite generates potentially synergistic properties. Hence we specifically address the effects of nanoscale layered silicate reinforcement of the rubber phase on the above-cited structure and performance parameters

Nanocomposites were prepared by specifically reinforcing the EPDM phase. The effects of reinforcement on structure and performance parameters, as well as on the EPDM cure characteristics, were studied. High concentrations of silicate nanoclay in the rubber phase of uncrosslinked polypropylene/EPDM blends (TPO's) mimicked a network structure similar to the one obtained from crosslinking the rubber, as in the case of a TPV. The morphology of the nanocomposites was characterized using atomic force microscopy (AFM). Rheological characterization was performed in dynamic oscillatory mode.

To obtain a full-text copy of this paper, please email us.