



### **SILANE-GRAFTING OF MONTMORILLONITE FOR CLAY/FKM NANOCOMPOSITES**

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Excellent resistance to heat, chemicals, oxidizing media and good physical properties are some of the unique properties that has made fluorinated elastomers interesting for industrial applications in the oil field. Better mechanical properties at elevated temperatures for these materials in addition to water and oil resistance, enhanced properties in wear, reduced swelling, and thermal resistance are desired. Therefore, we are developing new class of nanocomposites to yield strong, high-performance, wear-resistant and high-temperature materials. We have produced FKM nanocomposites mixed with modified Montmorillonite (MMT). A relatively new method for modification of the commercial nanoclays is silane grafting. In this work, octadecyltrimethoxysilane has been used for synthesizing modified MMT via different reaction conditions. Several synthesis parameters such as reaction time, temperature, solvents, and acid surface activation have been examined. X-Ray diffraction (XRD), thermogravimetric analysis (TGA), and Fourier transform infrared (FTIR) techniques were used to characterizeing of the modified nanoclays. The most promising nanoclays were blended with FKM and the effect of different concentrations of grafted nanoclays (2.5, 5.0 and 10 phr) on curing behavior and mechanical properties such as tensile modulus, elongation at break and swelling resistance of nanocomposites were studied. Further examination was done by Atomic Force Microscopy (AFM), Scanning Electron Microscopy (SEM), and Transmission electron microscopy (TEM) to study the structures of modified nanoclay/FKM nanocomposites and mechanical properties compared to FKM composites prepared with conventional and commercial nanofillers (carbon black or non-modified clays).