

## **INFLUENCE OF CLAY ON THE VULCANIZATION KINETICS OF FLUOROELASTOMER NANOCOMPOSITES**

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The vulcanization kinetics of gum and montmorillonite (Na-MMT) clay filled fluoroelastomer (FKM) nanocomposite was studied using both oscillating disc rheometer (ODR) and differential scanning calorimetry (DSC) under isothermal and dynamic conditions. The X-ray diffraction pattern of clay filled FKM showed a shift in d-spacing toward higher values indicating the formation of intercalated silicate layer. The cure characterization showed higher rate and state of vulcanization of modified clay filled compound than that of gum and unmodified clay filled FKM indicating the accelerating effect of quaternary ammonium salt modified clay. Although the unmodified clay slowed down the cure reaction, there was marked increase in cure rate at higher level of curative. Higher loading of clay decreased the cure rate with lowering of maximum torque values. The presence of organoclay increased the torque value through the formation of confined elastomer network within the silicate galleries. The experimental data obtained provided the evidence that the curing behavior illustrated autocatalytic characteristics. The kinetic parameters determined from the model equation had good agreement with the experimental results. The calculated activation energy of the gum and clay filled systems indicated the ease of cure process with respect to the type of clay. The cure kinetics measured by different methods was well correlated with each other.