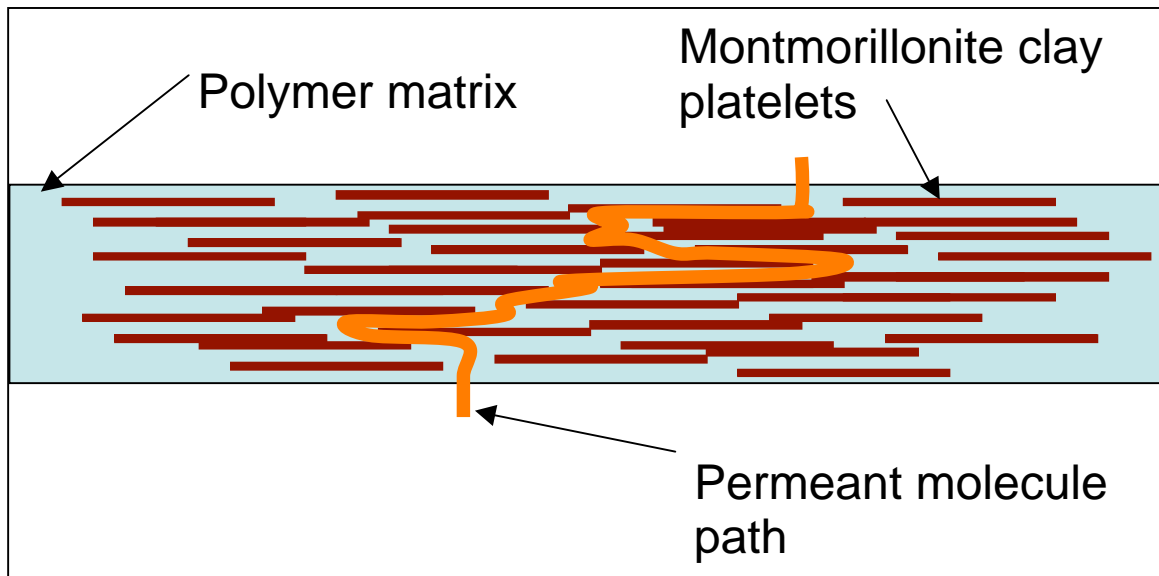


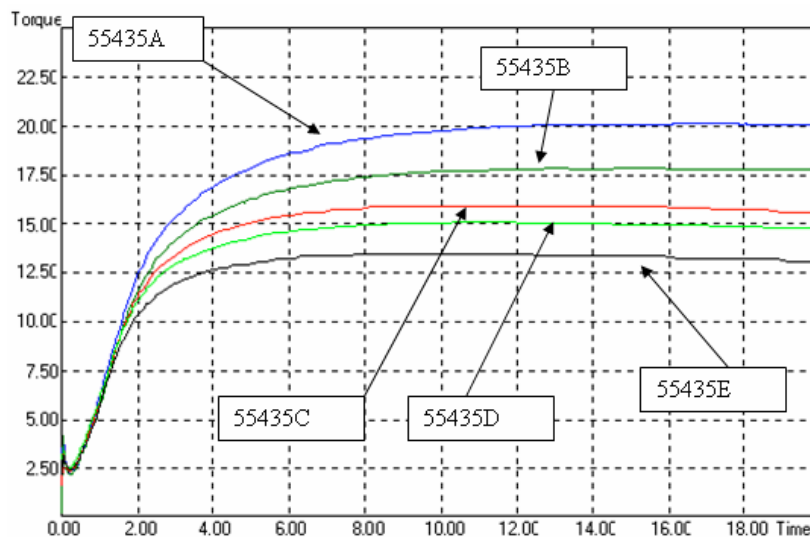
CASE STUDY 1 – Compound development of treated nanoclays in rubber

ARTIS have studied the effect of nano functionalised montmorillonite clays in a range of rubber formulations. Of particular interest was the effect on permeability of solvents with EPDM rubber. From literature and previous studies it was believed that intercalation of the nano-clay platelets within the EPDM polymer matrix could be exploited to produce a torturous permeation path and decrease permeability.



Schematic of platelet diffusion mechanism

EPDM formulations were studied using organo-clay / carbon filler systems. Though a significant effect on cure was found using a moving die rheometer only minimal effects on mechanical properties were found.



Rheo curves for compounds

Diffusivity coefficients were calculated from mass uptake measurements in ethyl acetate showing a 53% reduction in diffusivity co-efficient. Dynamic mechanical testing of the compounds at low strain amplitudes shows considerable changes in dynamic behaviour which are indicative of excellent intercalation of the nano-clay platelets. XRD and TEM analysis confirm this.

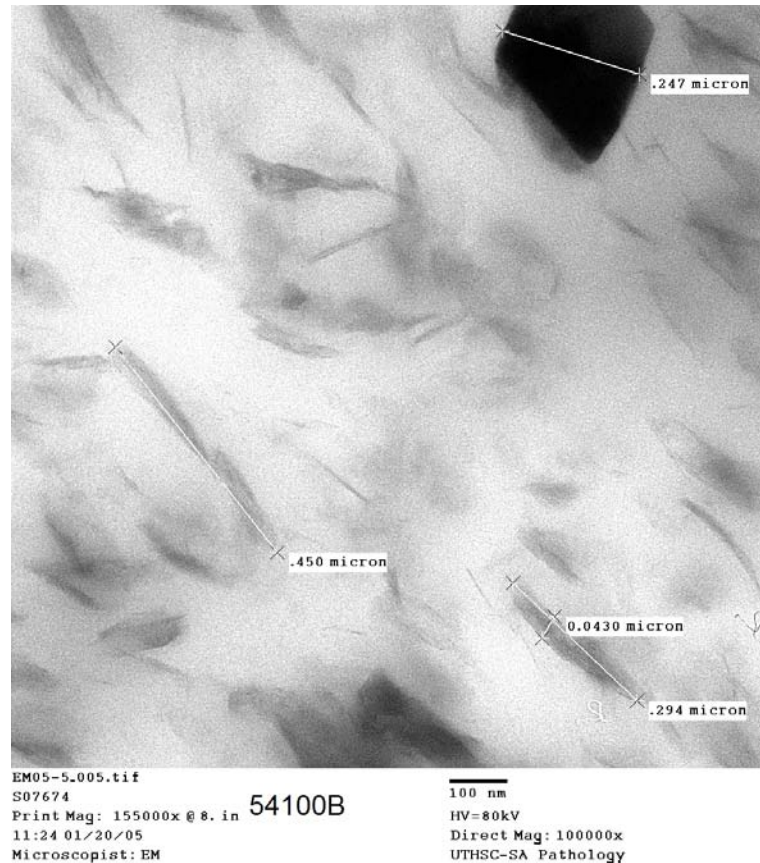


Figure 1
TEM picture of platelets (Courtesy of Southern Clay Products Inc)