

## **Effect of ammonium and aminosilane montmorillonites organo-clayson the curing kinetics of unsaturated polyester (UP) resin nanocomposites**

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### **Abstract**

The curing kinetics of UP nanocomposites prepared by incorporating different amounts of two kinds of organo-montmorillonite (organo-MMT): trimethyloctadecacylammonium chloride (TMOA) and aminopropyl-triethoxysilane (APTES) were studied by non-isothermal differential scanning calorimetry (DSC) experiments. Small angle X-ray scattering (SAXS) was used for measuring the d-spacings in the modified organo-clays, and no intercalation UP into these clays was observed for the nanocomposites. HRTEM images showed dispersed and agglomerated platelets in UP/APTES 2 and 10 wt.%. DSC analysis showed two peaks in UP resins and UP/organo-MMT, and a decrease in the exothermal peaks temperature ( $T_{p1}$  and  $T_{p2}$ ) for nanocomposites with the heating rate as compared with those of neat UP system; thus, the higher the heating rate, the higher the curing reaction rate. This effect was more clearly on the UP/MMT-APTES nanocomposites. The effective activation energies ( $E_a$ ) were determined with the mode-free isoconversional Starik's method. Sesták–Berggren model was chosen to simulate the reaction rate with a good match achieved. Thermal gravimetric analysis showed that the cured UP/APTES at high concentration were slightly more stable than UP and TMOA.

### **Biography**

Maria de los Angeles Vargas has completed her PhD from Mexico University and Post-doctoral studies from Institute of Technology Karlsruhe in Germany. She has a Lecturer position at the Higher Education Technology in Chemical Engineering Department, Mexico. She has published more than 16 papers in reputed journals and book chapters in NMR at 20 MHz: Possibilities and Challenges.

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