

Improved Thermal Stability of Crown Ether and Imidazolium Treatments for Polymer Layered-Silicate Nanocomposites.

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ABSTRACT:

The thermal stability of the organic treatment present on a layered silicate is of utmost importance in preparing a polymer-layered silicate nanocomposite by melt processing methods, especially for polymers with high melt temperatures. Currently used alkyl ammonium treatments for polymer layered-silicate nanocomposites begin decomposition around 200 °C, and many polymers used for aircraft interiors are processed above that temperature. We will present NMR evidence that processing-shear controls the degradation of the alkylammonium treatment. Recent work done in our laboratory has developed two new types of organic treatments for clays, with each having significantly higher thermal stability. The two new types of organic treatments are crown ethers and imidazolium salts. The work presented in this paper shows the thermal properties of this material as well as their ability to be dispersed in a polymer when used to make a nanocomposite. We will also present our progress in developing High Throughput Methods to characterize the flammability polymers.