



INVESTIGATION OF PVC NANOCOMPOSITES PREPARED BY MELT BLENDING

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PVC nanocomposites are new interesting opportunities to further expand PVC on the market due to the significant macroscopic material properties enhancement over neat polymers and conventional composites. In this work, nanocomposites of PVC/organoclays were prepared and characterized in order to understand the influence of polymer molecular weight in some of the material properties. Rigid, transparent PVC/organoclay nanocomposites containing impact modifier in the formulation (ternary matrixes) were prepared by melt blending. Two suspension PVC resins with different molecular weights were used. Three types of clays (montmorillonites - MMTs) were investigated; two organically modified (Cloisite® 30B and Cloisite® 20A) and one hydrophilic (Cloisite® Na⁺). Clay concentrations were 1%, 3% and 5% (w/w). PVC/MMTs were WADX analyzed and evaluated regarding thermal degradation and color evolution. WADX results showed exfoliated or partially exfoliated/intercalated structures, being the best case the lowest clay concentration (1%). Exfoliation seems to be better for nanocomposites prepared with Cloisite® 20A in combination with lower molecular weight resin. Important color degradation was detected as a function of clay content, type of modifier and polymer molecular weight. The most serious degradation was the one from Cloisite® 20A, especially when combined with the higher molecular weight resin. In order, the dispersion level of these nanocomposites was evaluated by transmission electron microscopy (TEM), and the results indicated that exfoliated-intercalated nanocomposites were formed, confirming previous WADX analysis.