



### EVALUATION OF PERMEABILITY OF LDPE/PA6/CLAY NANOCOMPOSITE FILMS

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In this research, nanocomposites based on low density polyethylene (LDPE), Polyamide 6 (PA6), maleic anhydride grafted polyethylene (PEMA) and organomodified montmorillonite (O-MMT) Cloisite 30B were prepared. Differential Scanning Calorimetry (DSC) and Small Angle Xray (SAX) were used to characterize the crystallinity content and nanoclay distribution in the blends respectively. The materials were compounded by co-rotating twin screw extruder at speed of 200rpm and different temperature zone. LDPE-g-MA was used as compatibilizer to improve interaction between polymer blend and organoclay. Small Angle Xray (SAX) analysis showed an intercalated clay structure for the LDPE/PA6/clay nanocomposite with 3% clay and a potentially exfoliated structure with 5% clay, but for LDPE/PA6/PEMA/clay nanocomposite both composition showed a potentially exfoliated structure. The blends were filmed by film blowing process at specific conditions to evaluate the permeability of LDPE/PA6/PEMA/clay nanocomposite. The results revealed that the water vapor permeability by a factor of 0.1 was reduced by incorporation of PA into PE in presence of organoclay in comparison with neat PA and PA/clay nanocomposite and also the oxygen permeability was reduced. The crystallinity of nanocomposites was studied by Differential scanning calorimetry (DSC). Given the fact that crystals are effectively non-permeable, the concomitant reduction in crystallinity of the blend with decrease in permeability suggests that barrier properties arise from tortuosity of nanoparticles in the blend.