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Enhanced Oxygen Barrier and Interfacial Adhesion of Polystyrene/Clay Nanocomposites via Plasma Surface Modification PATCHARA TASANATANACHAI, RATHANAWAN MAGARAPHAN,

The Petroleum and Petrochemical College, Chulalongkorn University — Bentonite layered-silicate was the selected nanofiller to be studied and filled in polystyrene, consequently represented PS/clay nanocomposites. The plasma technique developed in our laboratory was utilized as the clay pretreatment method to provide the radical sites on the clay surface prior to styrene grafting step. Gas barrier property and impact strength, one of the most serious deficiencies of polystyrene, were examined. Oxygen permeability was found to be decreased moderately even small amount of modified clay loaded. As the result of plasma surface modification, it was found that grafting of styrene was occurred mainly on the outer clay layer since FT-IR spectra showed the characteristic peak of polystyrene with the same basal-spacing like pristine clay. The broadening of diffraction peak of PS/clay nanocomposites produced by melt intercalation was observed suggesting the structure of both intercalation and partial exfoliation; however, the impact strength was reasonably improved which can imply to the enhancement of interfacial adhesion between clay particles and polystyrene matrix. In addition, the ratio of styrene and initiator played the significant role on these properties as well.

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