

Kittipong Wongwaree 2011: Bond Strength Modification of Polymer Pairs via UV Irradiation. Master of Engineering (Materials Engineering), Major Field: Materials Engineering, Department of Materials Engineering. Thesis Advisor: Mr. Somjate Patcharaphun, Ph.D. 170 pages.

The aim of this research was to improve the adhesion strength between the polymer pairs by using of UV irradiation technique. The polymers used in this work were Polypropylene (PP), Polystyrene (PS), High impact polystyrene (HIPS), and Acrylonitrile-butadiene-styrene (ABS). The analytical results obtained by Fourier Transform Infrared Spectrometer (FTIR) indicated that the hydroxyl and carbonyl groups (polar) occurred at the UV-activated surface of PS, HIPS and ABS, in that the longer the length of treatment the higher the hydroxyl and carbonyl groups. This was mainly attributed to the photo-oxidation of butadiene segments and unsaturated polymer in aromatic ring of PS, HIPS and ABS molecular chains, resulting in the surface degradation. In addition, the measured results of contact angle also showed that the contact angle tended to decrease with increasing period of treatment, indicating that the increase of polarity at the surface. From the adhesion strength obtained in this work, however, it was found that the shear strength especially for the pairs of ABS and pPVC tended to decrease increasing length of treatment, while in the case of PP no significant changes in photo-oxidation degradation was found. Furthermore, by using Ethylene Vinyl Acetate (EVA) and Ethyl Cyanoacrylate (ECA) as an adhesive, it can be seen that the adhesion strength of ABS/ABS significantly increased with increasing length of treatment as a result of the chemical compatibility and the occurrence of secondary bond between ECA and ABS.

\_\_\_\_\_  
Student's signature

\_\_\_\_\_  
Thesis Advisor's signature

\_\_\_\_ / \_\_\_\_ / \_\_\_\_