

FT-IR Study on Poly(urethane-isocyanurate) Foam : Identification and Semi-Quantitative Analysis

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Compared with polyurethane, polyisocyanurate has several advantages, such as higher thermal stability and fire resistance, lower smoke emission, greater compressive strength, and better dimensional stability. The advantages of poly(urethane-isocyanurate)(PIR) is due to the strong molecular structure and the attractive interactions originated by the ring structure of isocyanurate, high cross linking density, and hydrogen bonding interactions of the repeat units of PIR. However, polyisocyanurate is very brittle and has low flow ability, as the results, it is difficult to process polyisocyanurate. To overcome the processing disadvantage, the ester type polyol segment is connected, through urethane linkage, to the isocyanurate structure. And the final form of the modified polyisocyanurate has both isocyanurate and urethane groups. Several side reactions are expected to take places in synthesizing PIR. We are trying to identify the repeating groups composed of the PIR that is synthesized from 4,4'-methylene diphenyl diisocyanate(MDI) and poly(oxyethylene-*co*-adipate)diol using FT-IR. In addition, we will demonstrate the semi-quantitative analysis of the PIR.