

Chemical Structure and Thermal Properties of flexible Polyurethanes with Silicon Carbide

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Flexible polyurethane elastomers and silicon carbide (SiC) were prepared to the composites by using polyether polyol and 4,4'-diphenylmethane diisocyanate for the main ingredients. SiC was added from 0 wt.% up to 30 wt.% by the solution mixing. Infrared (IR) spectroscopy was used to investigate the chemical structure of the composites. IR results clearly showed increasing of the peak intensity of CH₂- group (2850-2970 cm⁻¹) when SiC fraction was increased. This can be suggesting that SiC fraction affect polymeric chain of flexible polyurethane, especially in the soft segment [1], whenever SiC particle evenly disperse in polyurethane elastomers matrix. Moreover, the relative intensity of CH₂ increase with decrease in chain length [2]. Differential scanning calorimetry (DSC) measurements were carried out for thermal characterization. The thermograms reveal that the glass transition temperature of the soft segment (T_{g,ss}) of polyurethane elastomers did not change significantly with adding SiC. T_{g,ss} is exhibited at around -64°C. Besides, the enthalpy of melting was increased with increasing SiC fraction while the endothermic peak temperature showed between 66-70°C. The broad endotherms peak tends to increase with high fraction of SiC. This indicated that SiC fraction related to a small degree of ordering in the hard segment domains [3, 4]. However, the glass transition temperature of the hard segment could not detect by DSC technique in this study.

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