Study on the Synthesis and Characterization of Melting-Grade Thermoplastic Polyurethane Elastomers

張詔斌、

E-mail: 8809524@mail.dyu.edu.tw

ABSTRACT

Thermoplastic polyurethane elastomers (TPU) possess several excellent properties such as abrasion-resistance, elasticity, tear strength and oil-resistance. The synthesis of thermoplastic polyurethane was carried out by a one-shot process using polyester polyol, diphenyl-methane-4, 4-diisocyanate (MDI), and two chain extenders. 1,4-Butanediol and bisphenol A ethoxylate were used as the 1st and the 2nd chain extenders, respectively. From their viscosities and thermal properties data, we found that TPUs with a higher proportion of the 2nd chain extender show better thermal and molecular weight stabilities. Interestingly, the TPU with a higher proportion of the 2nd chain extender also shows more yellowish in color by comparing the appearance of TPUs after treated at a high temperature. DSC and TGA analysis also exhibited higher soften point and second degradation temperature of TPUs due to bisphenol A ethoxylate added.

Keywords : bisphenol A ethoxylate ; diphenylmethane-4 ; 4-diisocyanate (MDI) ; chain extender ; one-shot process ; thermoplastic polyurethane elastomer (TPU)

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