Study on the Process and Characterization of Thermoplastic Polyamide Elastomers

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ABSTRACT

The advantages of thermoplastic polyamide elastomers (TPAEs) are good physical and chemical properties, simpler processing, lower density, better control of product quality and recycling of scrap. The disadvantages are often requires long synthesis processing, high water absorbency, high monomer and oligomer content. The objects of this research is to modify the structure and process of TPAEs, so as to reduce the processing time, to decrease the monomer and oligomer content, and to enhance the TPAEs water resistance. The synthesis of C36 dimer acid modified TPAEs were done. In a one-step process, C36 dimer acid was mixed with adipic acid as a second chain extender in a reaction which included caprolacatam and PTMEG as hard segment and soft segment respectively. The thermal properties of TPAEs were studied by a DSC and TGA, and water absorption of TPAEs were tested to determined the tendency of samples to absorb moisture. Results showed that modified TPAEs with higher C36 dimer acid content have better thermal properties as well as water resistance. We also introduced Nylon 6 as starting materials of TPAEs polymerization . The synthesis of TPAEs was carried out by two-step process. First, Nylon 6 was depolymerized to oligomer, then reacted with PTMEG and added adipic acid as chain extender to form TPAEs. Results showed low degree of TPAEs polymerization and bed properties. It should need further investigation.

Keywords : thermoplastic polyamide elastomers (TPAEs) ; thermoplastic elastomers (TPEs) ; C36 dimer acid ; poly (teramethylene ether) glycol (PTMEG) ; chain extender ; hard segments ; soft segments ; Nylon 6

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