Thermal Properties of Segmented Block Copolyetheresters Based on Poly(butylene terephthalate) and Poly(tetramethylene ether glycol). 2 - Effect of Annealing -

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The effect of annealing on the morphology and melting behavior of segmented block copolyetheresters based on poly(butylene terephthalate) and poly(tetramethylene ether glycol) was examined with the viewpoint of hard segment contents versus hard segment length. The number average molecular weights of PTMG used were 650, 1000, and 2000.

The melting thermograms of annealed copolyetheresters changed greatly as compared with the original samples. Annealed samples whose hard segment contents were 80wt% always showed two characteristic endotherms; new endotherms just above the annealing temperature and the sharpened main melting peak regardless of PTMG molecular weight. The samples whose hard segment contents were 65, 50, 35wt% showed similar behavior as the 80wt% samples except that there showed new endothermic peaks located above the their main melting temperatures. It was thought to be due to the crystallization of long hard segment blocks which were in amorphous phase. These new endothermic peaks changed with PTMG molecular weight. In these samples crystallinity increased with increasing annealing time through lamella thickening and formation of new crystal as confirmed by the changes in melting thermograms. On the other hand the samples contaning 20wt% hard segment contents did not show any considerable change in crystallinity on annealing.

The response of copolyetheresters to annealing was found to depend on both hard segment length and soft segment lengths. The overall crystallinity Xc increased for samples with high hard segment content on annealing, while it remained constant for samples with low hard segment contents regardless of PTMG molecular weight. The hard segment crystallinity Wc did not vary significantly with hard segment content or hard segment length when their hard segment contents were over 35wt%.