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论文

拉伸状态下弹性聚醚酯聚集态结构和分子运动的固体高分辨核磁共振研究

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摘要 用固体高分辨核磁共振碳谱方法对不同拉伸比的聚醚酯嵌段共聚物的聚集态结构和分子运动进行了研究, 发现共聚物中的聚四氢呋喃(PTMO)链段在拉伸比为20时开始就出现结晶, 且结晶度和晶片厚度都随着拉伸比增加而明显增加, 而样品中未结晶部分的高频分子运动随拉伸比的变化则不明显, 拉伸导致的PTMO结晶主要发生在“纯”的PTMO非晶区. 通过^{1}H自旋扩散实验, 估算出在拉伸比为4.0倍时, PTMO非晶区与结晶区的界面层厚度为1.1nm , PTMO非晶区与硬段的结晶区的界面厚度约为3.1nm.

关键词 聚醚酯 原位拉伸 固体高分辨核磁共振 聚集态结构 分子运动

分类号

INVESTIGATION ON THE MORPHOLOGY AND MOLECULAR MOTIONS OF THE *in-situ* STRETCHED POLY(ETHER-ESTER) BY SOLID-STATE HIGH-RESOLUTION ^{13}C-NMR SPECTROSCOPY

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Abstract The morphollgy and molecular motion of *in situ* stretched poly (ether-ester) samples were studied by high-resolution solid-state ^{13}C-NMR techniques Stretch-induced crystallization of the soft segment,*i*．*e*．ploy-(tetramethylene oxide)(PTMO),was observed at a draw ratio of 2.0．The degree of erystallinity of PTMO and the lamellar thickness of the crystallites were found to increase with increasing of draw ratio．The molecular motion at high frequency of the amorphous PTMO was found to be almost independent on the draw ratio．It was demonstrated that the stretch-induced crystallization mainly happens in the“pure”PTMO region．^{1}H spin diffusion experiment was carried out on the sample with the draw ratio of 4.0．The thickness of the interfacial region between the amorphous and crystalline PTMO of the sample was estimated to be 1.1 nm,while that between the amorphous PTMO and the erystalline hard domain to be 3.1 nm．

Key words Poly（ether-ester） *in-situ* Stretching High-resolution solid-state ^{13}C-NMR Morphology Molecular motion

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