

论文

*p*PDA/ODA-PMDA嵌段共聚酰亚胺薄膜的聚集态结构

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摘要:

通过控制2个组分的序列长度, 制备了*p*PDA(对苯二胺)/ODA(4,4'-二氨基二苯醚)-PMDA(均苯四羧酸二酐)嵌段共聚酰亚胺(b-PI). 采用偏光显微镜(PLM)、广角X射线衍射(WAXD)、透射电子显微镜(TEM)和力学性能测试研究了b-PI薄膜的聚集态结构. 结果表明, 所有b-PI薄膜均可结晶, 生成微晶或不完善的小球晶. 刚性棒状的*p*PDA-PMDA分子链段发生相分离, 形成晶核, 半刚性的ODA-PMDA分子链以*p*PDA-PMDA为晶核进行晶粒生长. 在结晶过程中, 晶核数目取决于*p*PDA/ODA比值及*p*PDA-PMDA(PP)链段长度, 而晶粒尺寸依赖于ODA-PMDA链段(PO)的运动能力. 通过调节二元胺的比例及2个嵌段组分的序列长度, 可以对薄膜的聚集态结构实现可控制备, 从而达到对性能的控制.

关键词: 嵌段共聚酰亚胺; 聚集态; 结晶

Morphology of *p*PDA/ODA-PMDA Block Copolymer

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Abstract:

*p*PDA/ODA-PMDA block copolymers(b-PIs) with different segment length of two components were prepared. Morphology and properties of their films were investigated by polarizing microscope(PLM), wide-angle X-ray diffraction(WAXD), transmission electron microscope(TEM) and tensile test. Measured results show all films of b-PI are crystalline. At first, phase separation of rigid segment of *p*PDA-PMDA takes place, forming nuclei. Then, semi-rigid segment of ODA-PMDA grows around the nuclei and forms small and imperfection grains. The number of nuclei is dependent of the ratio between *p*PDA and ODA and segment length of *p*PDA-PMDA(PP), while the size of grains is depended on the movability of ODA-PMDA(PO)segment. Morphology and properties of films can be controlled by changing the ratio of dianamines and segment length of two components.

Keywords: *p*PDA/ODA-PMDA block copolymer; Morphology; Crystalline

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