

论文

聚苯乙烯/聚二甲基硅氧烷嵌段共聚物的表面形态研究

吴宁晶, 郑安呐, 姚文斌, 黄永民

华东理工大学超细材料制备与应用教育部重点实验室; 华东理工大学化学工程国家重点实验室; 华东理工大学化学工程国家重点实验室 上海; 青岛科技大学橡塑材料与工程教育部重点实验室青岛
收稿日期 2005-5-16 修回日期 2005-8-1 网络版发布日期 接受日期

摘要 采用原子力显微镜(AFM)和透射电镜(TEM)研究了聚苯乙烯/聚二甲基硅氧烷嵌段共聚物(PS-*b*-PDMS)薄膜的相形态. 结果表明, 当采用甲苯作为溶剂, 旋转涂膜的薄膜样品呈现网络状的形态分布在表面, 而样品所对应的透射电镜照片中, PDMS相作为球状分布在PS的连续相中. 退火温度对共聚物表面形态有一定的影响, 当退火温度高于PDMS的玻璃化温度, 表面中PDMS相增多. PS-*b*-PDMS嵌段共聚物的表面形态随着所用溶剂的变化而有所不同, 当采用甲苯作为溶剂时, 样品的PS相形成凹坑分布在PDMS的相区之中, 而采用环己烷作为溶剂时, PS相作为突起分布在PDMS相区之中. 另外, 基底对共聚物薄膜表面形态的有较大的影响, 当采用硅晶片作为基底时, 样品中的PDMS相和PS相呈现近似平行于表面的层状结构.

关键词 [原子力显微镜](#) [相形态](#) [聚苯乙烯](#) [聚二甲基硅氧烷](#)

分类号

STUDIES ON THE SURFACE MORPHOLOGY OF POLY(STYRENE-*b*-DIMETHYLSILOXANE) COPOLYMER THIN FILMS

WU Ningjing^{1,2}, ZHENG Anna¹, YAO Wenbin³, HUANG Yongmin³

1 Key Laboratory for Ultrafine Material of Ministry of Education; East China University of Science and Technology; Shanghai 200237; 2 Key Laboratory for Rubber-Plastics of Ministry of Education; Qingdao University of Science and Technology; Qingdao 266042; 3 State Key Laboratory of Chemical Engineering; Shanghai 200237

Abstract Morphology of poly(styrene—block—dimethylsiloxane)(PS—*b*-PDMS)copolymer thin films was analyzed by atomic force microscopy(AFM)observation and transition electron microscopy(TEM)measurements. The asymmetric copolymer thin films spin—cast from toluene on mica presented a mesh-like structure, which was different from the spherulop structure in the bulk. The annealing temperature affected the surface morphology of PS-*b*-PDMS copolymer thin films, PDMS microdomains at the surface were increased when the annealing temperature was higher than the PDMS glass transition temperature. The morphology of PS—*b*-PDMS copolymer thin films was different from solvent to solvent, for thin films spin-cast from toluene, the PS phase was pits in PDMS matrix. While the thin film spin-cast from cyclohexane solution exhibited an island—like structure. small separated PS phase appeared as protrusions over the macroscopically flat surface. The microphase structures of the PS—*b*-PDMS copolymer thin films were also strongly influenced by the different substrates, for an asymmetric block copolymer thin film, the PDMS and PS phases on silicon substrate presented lamellae structure parallel to the film surface.

Key words [Atomic force microscopy \(AFM\)](#) [Phase morphology](#) [Polystyrene](#) [Polydimethylsiloxane](#)

DOI:

通讯作者 吴宁晶

扩展功能

本文信息

▶ [Supporting info](#)

▶ [PDF\(2657KB\)](#)

▶ [\[HTML全文\]\(0KB\)](#)

▶ [参考文献](#)

服务与反馈

▶ [把本文推荐给朋友](#)

▶ [加入我的书架](#)

▶ [加入引用管理器](#)

▶ [复制索引](#)

▶ [Email Alert](#)

▶ [文章反馈](#)

▶ [浏览反馈信息](#)

相关信息

▶ [本刊中 包含“原子力显微镜”的 相关文章](#)

▶ [本文作者相关文章](#)

· [吴宁晶](#)

· [郑安呐](#)

· [姚文斌](#)

· [黄永民](#)