

研究简报

嵌段共聚物薄膜中条纹形态的螺旋结构

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摘要 利用溶液滴膜的方法在云母表面制备聚苯乙烯-聚异戊二烯-聚苯乙烯(SIS)三嵌段共聚物薄膜, 用原子力显微镜(AFM)观察其表面形态. 发现共聚物经微相分离, 在薄膜中形成平行于表面的条纹形态, 相周期约(38±5) nm, 并且观察到条纹环绕形成的螺旋图案, 图案尺寸超过1 μm. 在螺旋中心某一组分形成闭合端, 而其它区域条状相沿螺旋切线方向平行排列. 嵌段共聚物溶液成膜过程中, 螺旋图案的产生是由于微相分离过程耦合流体力学相互作用产生的不稳定性所导致.

关键词 [嵌段共聚物](#) [螺旋](#) [原子力显微镜](#)

分类号

Spiral Structures in a Stripe-forming Block Copolymer Thin Film

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Abstract Polystyrene-polyisoprene-polystyrene (SIS) triblock copolymer thin film was prepared by solution casting on the freshly cleaved mica surface. The film was then directly scanned using atomic force microscopy (AFM). It was observed that the copolymer microphase separated into stripe structure mostly parallel to the film surface with a period of 38±5 nm. A spiral structure with a diameter of more than 1 μm was circulated by the stripes. A closed end was formed with one of the components in the center of the spiral, and away from the spiral center the stripes bent along the tangent of the spiral. The occurrence of the spiral is due to the instability caused by the block copolymer microphase separation coupled with the hydrodynamic effect during the course of the film formation.

Key words [block copolymer](#) [spiral](#) [atomic force microscopy](#)

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