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材料物理和化学

纳米结构表面向列相液晶的聚合物锚定效应

周璇[1,2], 宋静静[3], 张志东[3]

1. 中国科学院 长春光学精密机械与物理研究所, 吉林 长春 130033;
2. 中国科学院 研究生院, 北京 100049;
3. 河北工业大学 理学院, 天津 300401

摘要： 提出了纳米结构聚合物表面的一个简化模型:由具有交替的沿面和垂面锚定的一维周期性条纹表面表征。利用Alexe-Ionescu等提出的扩展各向异性表面能形式,研究了向列相和取向层聚合物之间的锚定以及聚合物和基板表面之间的锚定对向列相液晶表面锚定的影响。在理论处理中,假设两不同锚定区域的锚定强度相等。结果表明:聚合物和基板表面之间的锚定会影响向列相的指向矢分布,降低松弛距离以及系统的总自由能。

关键词： 纳米结构表面 表面锚定 指向矢分布 预倾角

Effects of Polymer Anchoring on Nematic Liquid Crystals at Nano-Structured Surfaces

ZHOU Xuan[1,2], SONG Jing-jing[3], ZHANG Zhi-dong[3]

1. Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Sciences, Changchun 130033, China;
2. Graduate University of Chinese Academy of Sciences, Beijing 100049, China;
3. Department of Physics, Hebei University of Technology, Tianjin 300401, China

Abstract: A simplified model of the nano-structured polymeric surface was proposed, characterized by a one-dimensional periodic stripe patterned surface with alternate planar and homeotropic anchoring. This paper investigated the effect of both the coupling of nematic liquid crystals with alignment layer polymers and the coupling of the polymers with the substrate surface, on the anchoring of nematic liquid crystals at such a surface, using the extended anisotropic surface energy form proposed by Alexe-Ionescu *et al.* In our theoretical treatment, the equal anchoring strength of the two anchoring regions was assumed. The results show that the coupling of the polymer with the surface will affect the director field of the nematic, and reduce the relaxation distance as well as the total free energy of the system.

Keywords: nano-structured surface surface anchoring director distribution pretilt angle

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通讯作者: 张志东

作者简介:

作者Email: zhidong_zhang@yahoo.cn

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