

研究论文

层状溶致液晶中磁性纳米粒子掺杂的研究

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收稿日期 2005-9-27 修回日期 2006-3-15 网络版发布日期 接受日期

**摘要** 选择非离子表面活性剂十二烷基(4)聚氧乙烯醚(C<sub>12</sub>E<sub>4</sub>)与H<sub>2</sub>O构成的溶致液晶(LLC)层状模板, 掺杂油酸铵包覆的Fe<sub>3</sub>O<sub>4</sub>亲水性磁性纳米粒子, 构建稳定的有机/无机杂合体. 用透射电镜(TEM), X射线粉末衍射(XRD), 偏光显微镜(POM), 小角X射线散射(SAXS)和振动探针式磁强计(VSM)等对粒子及掺杂前后的层状液晶相结构变化进行表征. 结果表明, 粒子掺入使LLC模板的层间距产生了改变, 同时增强了体系有序性. 通过对杂合体表征结果的分析, 阐述了模板与粒子间相互作用的机理.

**关键词** [十二烷基\(4\)聚氧乙烯醚](#) [溶致层状液晶](#) [掺杂](#) [磁性纳米粒子](#) [小角X射线散射](#)

分类号

**Study on Lamellar Lyotropic Liquid Crystal Doped with Magnetic Nanoparticles**

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**Abstract** The stable organic/inorganic hybrids have been fabricated within lamellar phase of C<sub>12</sub>H<sub>25</sub>- (OCH<sub>2</sub>CH<sub>2</sub>)<sub>4</sub>OH/H<sub>2</sub>O lyotropic liquid crystals (LLC) by doping hydrophilic ammonium oleate-coated Fe<sub>3</sub>O<sub>4</sub> magnetic nanoparticles. Characterizations of the nanoparticles and the LLC phase structure before and after doping were performed respectively by transmission electron microscope, powder X-ray diffraction, polarized optical microscopy, small angle X-ray scattering and vibrating sample magnetometer techniques. Results show that the periodic spacing was influenced and the hybrid order was enhanced after doping nanoparticles. The interactions between the template and nanoparticles have been discussed through analyzing the hybrid characterization results.

**Key words** [lauryl poly\(oxyethylene\) ether](#) [lyotropic lamellar phase](#) [doping](#) [magnetic nanoparticle](#) [small angle X-ray scattering](#)

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