

技术及应用

# 浓度对提拉组装二维胶晶模板及其缺陷的影响

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**摘要** 分析了浸渍 提拉法制备二维聚苯乙烯胶体晶体模板的组装过程中微球的受力情况、运动状态和二维胶体晶体组装过程中空白和多层区域的产生过程; 通过浸渍 提拉自组装了大面积有序的胶体晶体, 研究了影响二维胶体晶体组装质量的两个主要参数提拉速度和粒子浓度之间的关系。结果表明, 适当提高胶体粒子浓度有助于降低环境波动带来的影响而快速得到高质量的二维胶体晶体。测试不同浓度下组装二维胶体晶体的合适速度可知, 当浓度小于8% (体积分数) 时, 理论与实验符合得较好。

关键词 [自组装](#) [胶体晶体模板](#) [浸渍-提拉法](#) [聚苯乙烯微球](#)

分类号

## Influence of Particle Concentration on 2D Colloidal Crystals Assembled by Dip-Coating

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**Abstract** The dynamics of polystyrene (PS) microsphere in thin layers of meniscus self-assembly 2D colloidal crystals was studied systemically. The mechanism of void and multilayer flaw was analyzed based on the model of assembly. A large scale, ordered monolayer of polystyrene sub-microsphere with a diameter of 300 nm was obtained by dip coating on glass surface. The substrate withdrawal velocity and the colloidal suspension concentration were studied for large scale 2D colloidal crystals in this work. Large domain 2D colloidal crystals could be rapidly fabricated from high concentration, reducing influence of environment fluctuation. By the experimental result and theoretical relationship between withdrawal velocity and colloidal concentration to synthesize 2D colloidal crystals, the experiment result is consistent with Nagayama's model when particles concentration is smaller than 8%.

**Key words** [self-assembly](#) [colloidal](#) [crystals](#) [dip-coating](#) [polystyrene](#) [microspheres](#)

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