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材料物理和化学

4 -乙烯基吡啶对电子纸用电泳粒子形貌的影响

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摘要：

基于双官能团单体4-乙烯基吡啶的特性,以甲醇为介质利用沉淀聚合法合成出二乙烯基苯-苯乙烯-4-乙烯基吡啶三元共聚圆球形产物。通过DSC检测,未发现玻璃化温度。TG的一阶微分曲线随着反应物用量的变化呈现规律性变化,并检测到吡啶基覆盖在微球表面。FT-IR测试到属于二乙烯基苯和苯乙烯的吸收峰770~875 cm^{-1} 和 1 450~1 725 cm^{-1},属于吡啶基的吸收峰1 600 cm^{-1},进一步证实了产物的结构。利用SEM图片对微球粒径和形貌变化规律进行分析,证实了三元共聚圆形微球的存在,并初步判断了微球形貌形成的机理,进而断定影响本聚合反应产物形貌的主要原因是4-乙烯基吡啶与甲醇之间的分子间作用力。据以上研究为基础,实现了产物微球在适当介质中的电泳性能,并发现zeta电位随微球半径的变化呈现一定的规律。

关键词： 自由基沉淀聚合 氢键 4-乙烯基吡啶 电泳

Influence of 4-Vinylpyridine upon Appearance of Electrophoretic Element Applied for Image Displays

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Abstract:

On the basis of property of 4-vinylpyridine, a spherical microsphere of poly (DVB-co- St-co- 4-VP) was prepared in methanol and by precipitation polymerization. After characterizations, no glass transition temperature was observed by DSC. Thermal stabilization of poly (DVB-co-St-co- 4-VP) was changed with varying ratios of comonomers, and pyridyl on the surface of the spherical microsphere was detected by TG. The structure unit of poly (DVB-co-St-co-4-VP) was confirmed by FT-IR, and two absorption bands of 770~875 cm^{-1} and 1 450~1 725 cm^{-1} were assigned to divinylbenzene and styrene, and absorption peak at 1 600 cm^{-1} was belonged to pyridyl. As a result, after analyzing appearances and diameters, the synthesizing mechanism different from existing theories was obtained and it was confirmed that appearance of product was dominated by hydrogen bond between pyridyl and hydroxyl.

Keywords: radical precipitation polymerization hydrogen bond 4-vinylpyridine electrophoresis

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