

研究论文

## 乙酸乙酯/乙醇混合溶液中分散聚合制备单分散亚微米级聚丙烯酰胺微球

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**摘要** 以乙酸乙酯/乙醇混合溶液为分散介质, PVP为分散剂, 通过分散聚合法合成了单分散亚微米级PAM微球. 在反应初期, 自动加速现象明显. 由于凝胶效应的影响, 分子量随着单体转化率的提高而逐渐增大. 考察了分散剂浓度对最终产物增率的影响, 并用IR光谱对产物的结构进行了表征, 证明分散聚合体系中吸附稳定机理和接枝稳定机理同时存在, 且以后者为主. 同时还研究了混合溶剂比例、分散剂浓度、初始单体浓度和引发剂浓度对微球粒径及粒径分布的影响. 结果表明, 乙酸乙酯/乙醇体积比在5:5-7:3范围内, 可得到粒径在200 nm左右, 且分布较窄的PAM微球; 分散剂浓度增大, 粒径减小; 引发剂浓度增加, 粒径增大; 初始单体浓度较高或较低时, 都得不到单分散性微球.

**关键词** [分散聚合](#) [聚丙烯酰胺](#) [亚微米级微球](#)

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## Preparation of Monodisperse Polyacrylamide Microspheres with Submicrometer Size in Ethyl Acetate/Ethanol Media by Dispersion Polymerization

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### Abstract

Using PVP as the stabilizer and AIBN as the initiator, monodisperse PAM microspheres sized in submicrometer were prepared in ethyl acetate/ethanol media by dispersion polymerization method. In the early period of the dispersion polymerization, auto-accelerate phenomenon was observed, and molecular weight gradually increased with the increase of the conversion because of the gel effect. The study on the FTIR spectrum of PAM and the effects of the concentrations of stabilizer on final increment ratio reveal that adsorption stabilization mechanism and graft stabilization mechanism are concurring in this system and the latter is dominant. The influences of polymerization parameters, such as concentration of stabilizer, initiator, monomer and solvent composition on the particle size and size distribution were also investigated. The size distribution is narrow when the volume ratio of ethyl acetate to ethanol ranges from 5:5 to 7:3. Particle size decreases with the increase of the concentration of stabilizer and the decrease of the concentration of initiator, moreover, monodisperse microspheres cannot be obtained when the concentration of monomer is too high or too low.

**Key words** [Dispersion polymerization](#) [Polyacrylamide](#) [Microsphere with submicrometer size](#)

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