

## 研究简报

### 高羧基含量无皂多孔聚合物乳胶粒的研究

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**摘要** 功能性聚合物乳液的性能与其功能基的含量密切相关.

采用完全无皂种子乳液聚合技术合成了具有不同羧基含量并且粒径分布均一的交联型聚甲基丙烯酸甲酯-丙烯酸乙酯因为甲基丙烯酸 [P(MMA-EA-MAA)] 乳胶粒, 然后通过碱后处理, 制备出了高羧基含量的无皂多孔P(MMA-EA-MAA) 乳胶粒. 系统研究了MAA对聚合反应、胶粒特性及胶粒多孔结构形态的影响. 结果表明: 在交联剂二乙烯基苯用量一定(0.3 g)的条件下, 随着MAA用量从4.0 mol%增加到

10.0 mol%, 聚合物交联程度( $P_x$ )从28.26%迅速增大至90.95%, 当其用量超过10.0 mol%后 $P_x$ 增大趋势变缓; 随着MAA用量的增加, 处理后胶粒体积膨胀百分率( $\Delta V$ )逐渐增大, 在MAA用量为12.0 mol%时 $\Delta V$ 达到42.1%的最大值, 当MAA用量增大到14.0 mol%时, 尽管 $P_x$ 高达95.44%, 胶粒仍具有完好的孔状结构.

**关键词** [无皂种子乳液聚合](#) [交联剂](#) [孔状结构](#) [羧基含量](#)

分类号

## Study on Soap-Free Porous Latex Particles Containing High Amount of Carboxyl Groups

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**Abstract** The properties of functional polymer latex is closely related to its functional group amount. Crosslinked poly(methyl methacrylate-ethyl acrylate-methacrylic acid) [P(MMA-EA-MAA)] latex particles with different amount of carboxyl groups and with narrow size distribution were synthesized by seeded emulsion polymerization in the absence of surfactant materials, and soap-free porous latex particles with high amount of carboxyl groups were obtained after alkali post-treatment. Influences of MAA on polymerization, latex properties and porous morphology were investigated. The results showed that when 0.3 g of divinyl benzene was used as crosslinking agent, the crosslinking degree increased significantly from 28.26% to 90.95% with the increase of MAA amount from 4.0 mol% to 10.0 mol%, and this increase became slowly as MAA amount was more than 10.0 mol%; the particle volume expansion ( $\Delta V$ ) was increased gradually as MAA amount increased, and reached a maximum of 42.1% when 12.0 mol% of MAA was used, and perfect porous morphology inside particles was observed even when the crosslinking degree reached 95.4% at 14.0 mol% of MAA.

**Key words** [soap-free seeded emulsion polymerization](#) [crosslinking agent](#) [porous morphology](#) [carboxylic acid amount](#)

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