

论文

## 高固含量低粘度P(MMA/BA/AA)乳液的制备及性能研究

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**摘要** 先利用半连续种子乳液聚合法制备固含量为50%, 粒径480nm的单分散甲基丙烯酸甲酯(MMA)、丙烯酸丁酯(BA)与丙烯酸(AA)的共聚物种子乳液; 然后以上述种子乳液为介质, 十二烷基硫酸钠为乳化剂, 碳酸氢钠为缓冲剂, 过硫酸铵为引发剂制备固含量72%, 乳胶粒具有二元分布特征的高固含量、低粘度稳定乳液: 其中大乳胶粒径500~600nm, 小乳胶粒径约80nm. 所得乳液中乳化剂总含量为聚合物质量的2.1%; 粘度在剪切速率为 $21\text{s}^{-1}$ 时为 $400\text{mPa}\cdot\text{s}$ . 另外, 相对于常规乳液, 所制备高固含量乳液胶膜具有更好的光泽度.

**关键词** [高固含量](#) [乳液](#) [丙烯酸酯](#) [制备](#)

分类号

## PREPARATION AND PROPERTY STUDY OF HIGH-SOLID-CONTENT AND LOW-VISCOSITY P(MMA/BA/AA) EMULSIONS

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**Abstract** A new method of preparing high-solid-content and low-viscosity poly(methyl methacrylate/*n*-butyl acrylate/acrylic acid) emulsion with relative low emulsifier concentration and simple technology was investigated. It contains two steps, *i. e.* (1) prepare mono-dispersed P(MMA/BA/AA) seeded emulsion with solid content at 50% and large particle size (480~500 nm) by semi-continuous seeded emulsion polymerization; (2) use the seeded emulsion as medium, sodium dodecyl sulfate as emulsifier, sodium bicarbonate as buffer and ammonia persulfate as initiator to prepare target emulsion by semi-continuous emulsion polymerization. The preparing period was about 8 h. The total mass ratio of monomers was MMA: BA=40: 60. and the amount of AA was 3.0% of the total mass of monomers. A series of such emulsions were prepared. in which the highest solid content was 72% with a viscosity of 400 mPa·s at a shear rate of  $20\text{s}^{-1}$  and the coagulum rate was 0.05%. and the emulsifier concentration of which was 2.1% of the mass of monomers. The stability during polymerization, particle size, rheology properties, gloss properties *etc.* of the seeded emulsion and the high-solid-content emulsion were also discussed and compared with the conventional emulsion, which was prepared with almost the same recipe. The results indicated that the obtained emulsions were bimodal in particle size, the large particle diameter was 500~600 nm and that of the small one was about 80nm. which led to its low viscosity. as well as better glossy properties of films. It is concluded that preparing high-solid-content P(MMA/BA/AA) with this method has the following merits, (1) simple technology, (2) short preparing period, (3) low emulsifier concentration, (4) low viscosity and high gloss value.

**Key words** [High solid content](#) [Emulsion](#) [Low viscosity](#) [Preparation](#)

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