

## 论文

### 核壳型含氟丙烯酸酯共聚物的合成及性能

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#### 摘要:

采用饥饿态半连续种子乳液聚合方法, 在十二烷基硫酸钠(SDS)/辛基苯基聚氧乙烯醚(TX-10)复合乳化剂的作用下, 分别选用甲基丙烯酸三氟乙酯(TFEM)、甲基丙烯酸六氟正丁酯(HFBM)和甲基丙烯酸十二氟庚酯(DFHM)为含氟单体, 合成以丙烯酸正丁酯(BA)、甲基丙烯酸甲酯(MMA)和含氟单体为原料的核壳型结构含氟丙烯酸酯共聚物乳液。

FTIR, <sup>1</sup>H NMR, TEM和DSC分析结果显示, 获得了BA/MMA/含氟单体的共聚物乳液, 且乳液具有明显的核壳结构。DSC, TGA和SEM-EDX的分析显示, 核壳型结构的共聚物具有优异的热力学稳定性和成膜性能; 长侧链或短侧链含氟单体对共聚物的热稳定性影响不明显, 但侧链较长的含氟单体所获得的聚合物在成膜过程中更易向表面迁移, 更能体现含氟聚合物的优点。

关键词: 含氟共聚物 饥饿态半连续种子乳液聚合 核壳结构 含氟侧链

### Synthesis and Properties of Fluorinated Acrylate Copolymer with Core-shell Structure

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#### Abstract:

The synthesis and characterization of fluorinated acrylate copolymer with core-shell structure was carried out in this paper by the starved semi-continuous seed emulsion polymerization. *n*-Butyl acrylate (BA) and methyl methacrylate(MMA) served as the non-fluorinated monomers. Trifluoro-ethyl methacrylate(TFEM), hexafluoro-butyl methacrylate(HFBM) and dodecafluoro-heptyl methacrylate(DFHM) served as the fluorinated monomers respectively. The analysis results of FTIR, <sup>1</sup>H NMR, TEM as well as DSC indicated that the prepared fluorinated acrylate copolymers were the typical core-shell structure. DSC, TGA, SEM-BSE and SEM-EDX characterizing results displayed that the core-shell copolymer presented an excellent thermal stability and film properties. Fluorinated monomers with a long or short fluorinated side-chain in the copolymer made trivial influence on the thermal stability. However, the long fluorinated side-chain preferentially migrated to the surface during the film formation and benefited the properties of the fluorinated acrylate copolymer.

Keywords: Fluorinated copolymer Starved semi-continuous seed emulsion polymerization Coreshell structure Fluorinated side-chain

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