

论文

高分子共混物中Friedel-Crafts烷基化反应原位增容与催化降解机理

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摘要:

采用GPC方法对共混组分的分子量、接枝率和降解度等数据进行分析, 发现 AlCl_3 催化剂对PS/POE共混物的作用表现在原位增容和催化降解两个方面. 结合Friedel-Crafts烷基化反应的特点细化反应过程, 发现PS/POE共混物在 AlCl_3 作用下发生接枝反应时, 有大量碳正离子出现, 而碳正离子周围的电子重排会导致分子链断裂, 从而引起共混组分出现大幅度降解. PS/POE/ AlCl_3 共混物中原位接枝与催化降解是一对竞争性反应, 同时存在, 并相互竞争.

关键词: 原位增容; Friedel-Crafts烷基化反应; PS-g-POE接枝共聚物; 催化降解

Mechanism of *in Situ* Compatibilization and Degradation by Friedel-Crafts Alkylation Reaction for Polymer Blends

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Abstract:

The Friedel-Crafts alkylation reaction is common in organic synthesis. However, only a few articles on the Friedel-Crafts alkylation reaction for *in situ* compatibilization of PS and polyolefin blends have been published so far. The mechanism of Friedel-Crafts alkylation reaction adopted in PS/polyolefin blends keeps unclear, and the concerned study is not sufficient. GPC analysis for PS/POE blends showed that the effects of AlCl_3 catalyst laid on *in situ* compatibilization and degradation. On the basis of detailed analysis on the characteristics of Friedel-Crafts alkylation reaction and the deeply understanding of the mechanism of *in situ* compatibilization for PS/POE/ AlCl_3 blends, it was found that there was the competition of two factors: the formation of PS-g-POE copolymer and the degradation of the blending components. In the presence of AlCl_3 catalyst, there were lots of carbocation appeared in PS/POE/ AlCl_3 blends. The carbocation attacked polyolefin and caused the chain scission through electron rearrangement, which resulted in the degradation of the blending components.

Keywords: *In situ* compatibilization; Friedel-Crafts alkylation reaction; PS-g-POE copolymer; Degradation

收稿日期 2008-11-18 修回日期 网络版发布日期

DOI:

基金项目:

宁波市自然科学基金(批准号: 2008A610057)资助.

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