

## 论文

### 短链支化聚乙烯的合成与表征

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#### 摘要:

合成了两类结构明确的乙烯共聚物, 通过FTIR, GPC, <sup>1</sup>H NMR和<sup>13</sup>C NMR表征了产物的分子结构, 分别研究了分子量和短链支化含量对两类共聚物结晶性能的影响. 采用阴离子聚合制备分子量( $M_w$ )20000~110000、分子量分布为1.1的1,2-结构摩尔分数为7%左右的聚丁二烯. 加氢反应后得到乙烯/1-丁烯模型共聚物的熔点和结晶度随着分子量的增加而下降. 采用茂金属催化剂Et[Ind]<sub>2</sub>ZrCl<sub>2</sub>催化乙烯与1-己烯共聚合, 制备分子量为100000左右, 共聚单体摩尔分数为0~5.5%的乙烯/1-己烯共聚物, DSC结果表明其熔点和结晶度随着共聚物中1-己烯含量的升高而降低.

关键词: 阴离子聚合; 加氢; 茂金属催化剂; 分子量; 短链支化

### Synthesis and Characterization of Short-chain Branched Polyethylene

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#### Abstract:

Two kinds of ethylene copolymers with controllable structures were synthesized and the molecular parameters were characterized by FTIR, GPC, <sup>1</sup>H NMR and <sup>13</sup>C NMR systematically. Effects of molecular weight( $M_w$ ) and the content of branched short chains on the crystalline properties of the resultant ethylene copolymers were investigated by DSC, respectively. First, polybutadienes with  $M_w$  ranging from 20000 to 110000, low polydispersity index(PDI=1.1) and almost the same content of vinyl (molar fraction about 7%) were synthesized by anionic polymerization. After hydrogenation, the melting point and crystallinity of the obtained model ethylene/1-butene copolymers decreased with the increase in  $M_w$  of the copolymers. Second, ethylene/1-hexene copolymers with about  $M_w$  100000 and of 0—5.5% 1-hexene were prepared by copolymerization of ethylene and 1-hexene *via* metallocene catalyst Et[Ind]<sub>2</sub>ZrCl<sub>2</sub>. DSC results show that the melting point and crystallinity of the ethylene copolymers decrease with the increase of the content of 1-hexene.

Keywords: Anionic polymerization; Hydrogenation; Metallocene catalyst; Molecular weight; Branched short chain

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