

论文

## 苯乙烯/丁二烯聚合反应挤出多嵌段共聚物结构表征及共聚机理的研究

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**摘要** 以双螺杆挤出机为反应器,采用丁二烯(B)与苯乙烯(S)混和单体,以有机锂为引发体系,本体一步合成了S-B多嵌段共聚物.采用过氧化氢在四氧化钨作用下对聚合物分子链进行了深度氧化,然后通过精制除去氧化降解产生的低分子物.<sup>1</sup>H-NMR和FT-IR分析表明共聚物中的双键全部被氧化断裂,而共聚物中聚苯乙烯的链节并未破坏.利用18角度小角激光光散射仪(MALLS)联用GPC对氧化降解后的聚苯乙烯碎片进行了分析,证明共聚物分子是由1条 $1 \times 10^4 \sim 4 \times 10^4$ 分子量的聚苯乙烯链段连接着数十个(S-B)嵌段的结构. TEM分析表明调节反应过程的工艺条件可以控制共聚物的织态结构.

**关键词** [反应挤出](#) [苯乙烯](#) [丁二烯](#) [多嵌段共聚物](#) [机理](#)

分类号

## STUDIES ON THE STRUCTURE AND FORMING MECHANISM OF STYRENE/BUTADIENE MULTI-BLOCK COPOLYMERS POLYMERIZED BY REACTIVE EXTRUSION

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**Abstract** By means of the closely intermeshing twin—screw extruder as the reactor and the mixed styrene(S)and butadiene(B)as the monomer,a novel multi—block copolymer(S / B)was synthesized by bulk polymerization with the organic lithium initiator. The PB blocks of copolymers were cleaved by reaction with hydrogen peroxide in the presence of osmium tetroxide,then the small molecules were removed out of the system by purification It was confirmed by<sup>1</sup>H—NMR and FTIR,that the double bonds in the molecule chains of the copolymers were fully oxidized,on the other hand,the segments of polystyrene in the molecules of the copolymers were kept intact The segments of polystyrene after oxidization were characterized by GPC cooperating with the multi—angle laser light scattering instrument(MALLS). It was found that the molecule of the copolymers was made of a segment of polystyrene with  $M_n$  of  $1 \times 10^4 \sim 5 \times 10^4$  linking tens of S-B blocks. Cooperated with the survey of TEM photographs,it was confirmed that processing could decide the structure of the polymer molecules.

**Key words** [Reactive extrusion](#) [Styrene](#) [Butadiene](#) [Multi-block copolymer](#) [Mechanism](#)

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