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材料化学工程与纳米技术

丁基橡胶聚合新型超重力反应器工艺

张雷，高花，邹海魁，初广文，吴一弦，陈建峰

纳米材料先进制备技术与应用科学教育部重点实验室;教育部超重力工程研究中心;国家资源有效利用国家重点实验室，北京化工大学

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摘要 将新型旋转填充床反应器（RPB）应用于阳离子聚合制备丁基橡胶（IIR）过程。实验初步考察了旋转填充床转子转速（N）和聚合温度（T_p）等工艺参数对聚合产物IIR分子量和分子量分布的影响规律。研究结果表明：在实验条件下，当N=1200 r·min^{-1}、T_p=-100℃时，采用超重力法新工艺制备的IIR的数均分子量达到2.89×10^5，分子量分布指数达到1.99。同时，物料停留时间小于1 s（现工艺30~60min），单位设备体积的生产效率提高了2~3个数量级。随着N的增大和T_p的降低，聚合产物IIR的分子量升高，而分子量分布变化不大。

关键词

超重力法 丁基橡胶 阳离子聚合

分类号

Preparation of butyl rubber by new high-gravity technology

ZHANG Lei，GAO Hua，ZOU Haikui，CHU Guangwen，WU Yixian，CHEN Jianfeng

Abstract

A novel rotating packed bed（RPB）technology was used to prepare butyl rubber for the first time.The effects of the operating parameters，such as rotate speed，polymerization temperature，on the molecular weight and molecular weight distribution of isobutylene-isoprene rubber（IIR）were investigated in the experiment.The results revealed that IIR prepared by the unique high gravity reaction technology with the molecular weight of 2.89×10^5，molecular weight distribution index of 1.99 and single-pass conversion 30% was obtained at N=1200 r·min^{-1}，T_p=-100℃ in the experimental condition.In addition，the mean residence time of the products was less than 1s while that of the conventional technology was 30—60 min.The production efficiency per unit volume of the equipment was increased by 2—3 orders of magnitude.With increasing N and decreasing T_p，the molecular weight of IIR increased whereas no obvious difference of the distribution index of molecular weight was observed.

Key words

high-gravity technology butyl rubber（isobutylene-isoprene rubber） cationic polymerization

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通讯作者 陈建峰,吴一弦 chenjf@mail.buct.edu.cn