

高分子量L型聚乳酸的合成与表征

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Synthesis and Characterization of High Molecular Weight Poly L-lactic Acid

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摘要 提供了一种制备高分子量聚乳酸的有效方法. 首先, 将L-乳酸单体和少量己二酸直接缩聚, 制得一定分子量、分子两端为羧基的聚乳酸预聚物; 然后, 与四氢邻苯二甲酸二缩水甘油酯(711环氧树脂)进行扩链反应, 制得高分子量聚乳酸. 研究了711环氧树脂与聚乳酸预聚物的扩链反应条件对最终产物聚乳酸分子量的影响, 发现在压力小于70 Pa, 温度为180°C, 711环氧树脂与聚乳酸预聚物的摩尔比为1.2:1时, 所得的聚乳酸分子量可达150 000以上. 另外, 采用FTIR, ¹H-NMR对扩链反应产物的结构进行了表征.

关键词: 聚乳酸 预聚物 环氧树脂 扩链

Abstract: An effective method to prepare high molecular weight poly L-lactic acid (PLLA) is reported. In this new process, a low molecular weight carboxyl terminated prepolymer was synthesized via polycondensation of L-lactic acid and a little adipic acid, and then the molecular weight was increased by a chain-extending reaction using 711 epoxy resin as a chain extender. The effect of synthetic condition, such as reaction temperature and content of the chain extender, on the molecular weight of PLLA was discussed. The average molecular weight was up to 150 000 at an optimum synthetic condition. ¹H-NMR and FTIR were used to characterize the polymers and the results indicated that high molecular weight PLLA was synthesized by the reaction between epoxy groups at the end of 711 epoxy resin and carboxyl end groups of PLLA prepolymer.

Keywords: poly L-lactic acid (PLLA), prepolymer, epoxy resin, chain extension

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