

研究论文

基于聚丙交酯的多嵌段聚氨酯的形状记忆性能和生物相容性

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摘要 制备了以聚丙交酯(PLA)为软段, 2,4-甲苯二异氰酸酯(TDI)与乙二醇(EG)反应产物为硬段的多嵌段聚氨酯(PLA-PU), 并对其形状记忆效应和生物相容性进行了研究. 形状压缩50%的样品从起始恢复温度(22~37 °C)开始, 在10 °C范围内可以恢复到起始形状, 形变恢复率接近100%, 形变恢复力最大值达到1.5~4 MPa. 细胞培养实验结果初步证明PLA-PU的细胞相容性与PLA相当, 因而有可能用作植入形状记忆医疗器械材料.

关键词 [聚氨酯](#) [聚丙交酯](#) [形状记忆](#) [生物相容性](#)

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Shape-memory and Biocompatibility Properties of Segmented Polyurethanes Based on Poly(L-lactide)

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Abstract A series of segmented poly(L-lactide)-polyurethanes(PLA-PU) were synthesized by a two-step method, with oligo-poly(L-lactide)(PLA) as the soft segments and the reaction product of 2,4-toluene diisocyanate(TDI) and ethylene glycol(EG) as the hard segments. The shape memory properties of PLA-PU were examined. The processed PLA-PU could recover almost 100% to their original shape within 10 °C from the lowest recovery temperature. In the recovery process, the PLA-PU showed a maximum contracting stress of shape change in the range of 1.5—4 MPa depending on the PLA segmental length and the hard-segmental content and higher than that of poly(ϵ -caprolactone polyurethane)(PCL-PU). Besides, the influence of deforming and fixing temperatures on shape memory properties of PLA-PU was studied in detail. They could affect not only the recovery temperature but also the maximum contracting stress. The experiments of cell incubation were used to evaluate the biocompatibility of PLA-PU. The results show that the biocompatibility of PLA-PU is comparable to that of the pure PLA. This kind of polyurethane can be used as implanted medical devices with a shape memory property.

Key words [Polyurethane](#) [Poly\(L-lactide\)](#) [Shape memory](#) [Biocompatibility](#)

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