

论文

ATRP与点击化学结合制备树状星型聚合物

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摘要:

本文通过将ATRP技术和点击化学相结合的方法来制备树状星型聚合物 $[(PMMA)_2PSt]_4$ 。首先通过1,3-偶极环加成反应对ATRP的核预聚物进行端基修饰, 得到后继ATRP反应的大分子引发剂, 进而引发第二单体的ATRP聚合生成树状星型聚合物。

关键词: 原子转移自由基聚合(ATRP) 点击化学 树状星型聚合物

Synthesis of Dendrimer-like Star Polymer by the Combination of ATRP and Click Chemistry

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Abstract:

A new approach to the synthesis of dendrimer-like star polymer,  $[(PMMA)_2PSt]_4$ , was presented *via* the combination of atom transfer radical polymerization(ATRP) and click chemistry. Firstly four-arm bromine-terminated polystyrene( $PSt-Br_4$ ) was obtained from ATRP of styrene using pentaerythritol tetra (2-bromoisobutyrate) as an initiator, and the  $(PSt-Br)_4$  was efficiently converted to the azido-terminated polymers $[(PSt-N_3)_4]$  through the bromine substitution reaction with sodium azide. Furthermore, the $(PSt-N_3)_4$  reacted with propargyl 2,2-bis[2-(bromomethyl)propionate]propionate *via* a click reaction, 1,3-dipolar cycloaddition reaction, and the polymer $[(PSt-Br_2)_4]$  containing eight end-bromine was obtained. The  $(PSt-Br_2)_4$  could further serve as a macroinitiator for the ATRP of methyl methacrylate(MMA). Accordingly, the dendrimer-like star polymer,  $[(PMMA)_2PSt]_4$  was successfully prepared. The structure of  $[(PMMA)_2PSt]_4$  was characterized *via* IR,  $^1H$  NMR, GPC and DSC.

Keywords: Atomic transfer radical polymerization(ATRP) Click chemistry Dendrimer-like star polymer

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