

论文

以环糊精为核的星形高分子合成及其温度、pH敏感性研究

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摘要 以不同用量的氯乙酰氯与 β -环糊精反应, 得到含有不同酰化度的氯乙酰化 β -环糊精, 以此化合物为引发剂, 采用原子转移自由基 (ATRP) 引发甲基丙烯酸 N,N -二甲氨基乙酯 (DMAEMA) 聚合, 得到温度及pH敏感的以 β -环糊精为核的星形聚合物. 通过红外光谱、 ^{13}C -NMR、 ^1H -NMR和氯元素滴定分析确定了酰化后的 β -环糊精的结构, 并采用红外光谱、 ^1H -NMR、元素分析、DSC表征了以 β -环糊精分子为核的星形聚甲基丙烯酸 N,N -二甲氨基乙酯的大分子结构, 紫外光谱研究表明聚合物水溶液具有明显的温度和pH敏感性.

关键词 [\$\beta\$ -环糊精](#) [聚甲基丙烯酸 \$N,N\$ -二甲氨基乙酯](#) [星形高分子](#) [温度及pH敏感性](#)

分类号

SYNTHESIS AND CHARACTERIZATION OF THE THERMO- AND pH SENSITIVE STAR POLYMERS WITH A RIGID CORE OF β -CYCLODEXTRIN

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Abstract Two kinds of chemical modified β -cyclodextrin(β -CD) with different acylation degree were synthesized relying on the content of chloroacetyl chloride agent used. The structures of β -CD with different degree of acylation were characterized using infrared spectroscopy. ^{13}C -NMR, ^1H -NMR and titration analysis. Infrared spectroscopy and ^{13}C -NMR indicated that acylations occurred at C-2 and C-6 position in β -CD, ^1H -NMR and titration analysis suggested that the acylation degrees of β -CD are 3.2 and 4.5, respectively. A series of star polymers having different average length of poly (N,N -dimethylaminoethyl methacrylate) were synthesized by atom transfer radical polymerization (ATRP) using anterior acylated β -CD as the initiator. The branch chain structure and their compositions were characterized using infrared spectroscopy, ^1H -NMR, element analysis and DSC. The star polymers prepared here had a hard ^1CD core with the potential to form inclusion complexes with certain small organic compounds, and also their aqueous solutions were studied by UV spectroscopy in order to explore their thermo- and pH sensitivities. The results showed that the novel star polymers exhibited clearly thermo- and pH respondings in accordance with the change of the environment.

Key words [Cyclodextrin](#) [Poly \(\$N,N\$ -dimethylaminoethyl methacrylate\)](#) [Star-shaped polymer](#) [Thermo- and pH sensitivities](#)

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