

论文

## 温度及pH敏感的 $\beta$ -环糊精聚合物微球的合成及药物控制释放研究

胡晖, 刘郁杨, 范晓东, 黄怡

西北工业大学理学院应用化学系; 西北工业大学理学院应用化学系 西安

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**摘要** 以反相乳液聚合得到了 $\beta$ -CD聚合物微球,对 $\beta$ -CD微球进行氯乙酰化改性后,利用原子转移自由基聚合的方法把聚甲基丙烯酸 $N,N$ -二甲氨基乙酯(PDMAEMA)接枝到 $\beta$ -CD微球上,从而得到了具有温度和pH响应性的 $\beta$ -CD聚合物微球.通过红外光谱、元素分析确定了PDMAEMA接枝的 $\beta$ -CD微球的结构,采用热台偏光显微镜直接观测到了 $\beta$ -CD微球的温度和pH敏感性.对模型药物染料木素(GNT)和苯丁酸氮芥(CLB)进行了控制释放研究,结果表明pH值可对微球的“内环境”起到“开关”作用,从而可构筑出一种新型的药物控制释放体系.

**关键词**  [\$\beta\$ -环糊精聚合物微球](#) [聚甲基丙烯酸 \$N,N\$ -二甲氨基乙酯](#) [温度及pH敏感性](#) [药物控制释放体系](#)

分类号

## SYNTHESIS OF THERMO- AND pH SENSITIVE POLYMER BEADS CONTAINING $\beta$ -CYCLODEXTRIN AND POLY( $N,N$ -DIMETHYLAMINOETHYL METHACRYLATE) AND THEIR CONTROLLED DRUG RELEASE BEHAVIOR

HU Hui,LIU Yuyang,FAN Xiaodong,HUANG Yi

Department of Applied Chemistry; Northwestern Polytechnical University; Xi'an 710072

**Abstract** Polymer beads containing  $\beta$ -cyclodextrin( $\beta$ -CD) were prepared by inverse emulsion polymerization, and then, the polymer beads with thermo- and pH sensitivities were synthesized by atom transfer radical polymerization (ATRP) using  $N,N$ -*i*-dimethylaminoethyl methacrylate (DMAEMA) as a functional monomer and anterior chloroacetylated  $\beta$ -CD as the initiator. Chain structure and their compositions for polymers grafting with poly( $N,N$ -*i*-dimethylaminoethyl methacrylate)(PDMAEMA) were characterized using infrared spectroscopy, element analysis, DSC and TGA. The thermo- and pH sensitivities for polymers containing  $\beta$ -*i*-cyclodextrin and PDMAEMA were inspected directly with a polarizing microscope equipping with a hot stage. Finally, the controlled drug release behaviors of these polymers were studied using anti-cancer drugs, genistein (GNT) and chlorambucil (CLB) as model compounds. Results show that the release efficiency for drugs depends on the pH value which can act as an “on-off” switch during the test. It was indicated that a controlled drug delivery system could be established according to these experimental data.

**Key words** [Polymer beads containing  \$\beta\$ -cyclodextrin](#) [Poly \( \$N,N\$ -dimethylaminoethyl methacrylate\)](#) [Thermo- and pH sensitivities](#) [Controlled drug delivery system](#)

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通讯作者 范晓东

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