

研究论文

基于主客体作用的多重刺激响应型超分子水凝胶的制备及性能

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摘要 利用单-6-脱氧-6-氨基- β -环糊精(β -CDNH₂)与双二茂铁亚甲基丁二胺季铵盐(FBI)之间的主-客体作用制备了一种性能特异的超分子水凝胶, 该水凝胶具有显著的热可逆性和pH刺激响应性, (NH₄)₂Ce(NO₃)₆的引入导致凝胶液化, 体系的颜色也由淡黄色转变为墨绿色. 扫描电镜结果表明, 在凝胶中胶凝剂 β -CDNH₂和FBI结合组成以带状纤维为特征的三维网络结构. ¹H NMR, FTIR, XRD以及循环伏安等表征结果表明, FBI与 β -CDNH₂间的主客体包结作用和 β -CDNH₂分子间的氢键作用是凝胶形成并能稳定存在的主要原因.

关键词 [超分子结构](#) [\$\beta\$ -环糊精](#) [二茂铁](#) [凝胶](#)

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Preparation and Properties of a Novel Multiple Responsive Supramolecular Hydrogel Based on Host-Guest Interaction

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Abstract A novel supramolecular hydrogel was prepared by utilizing the host-guest interaction between 6-deoxy-6-amino- β -cyclodextrin(β -CDNH₂) and N,N'-bis(ferrocenyl-methylene)diaminobutane(FBI) in an aqueous phase. The phase state of the hydrogel is sensitive to the changes of temperature and pH. Furthermore, introduction of a chemical oxidant, (NH₄)₂Ce(NO₃)₆, resulted in dissolution of the gel, and correspondingly the color of the system changed from light yellow to dark green. SEM measurements reveal that the network structure of the hydrogel is characterized by belt-like fibers. It is the fibers that intertwine into 3-dimensional networks. ¹H NMR, FTIR, CV, and XRD studies demonstrate that the host-guest interaction between FBI and β -CDNH₂, and the intermolecular hydrogen bonding between β -CDNH₂ are the main driving forces for the formation of the gel.

Key words [Supramolecular structure](#) [\$\beta\$ -Cyclodextrin](#) [Ferrocene](#) [Gel](#)

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