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研究论文

聚(3-丙烯酰胺基苯硼酸-*N*,*N*-二甲基丙烯酰胺-丙烯酰胺)凝胶的合成和糖敏感性能

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摘要 用自由基引发3-丙烯酰胺基苯硼酸(AAPBA)、*N*,*N*-二甲基丙烯酰胺(DMAA)和丙烯酰胺(AAm)共聚交联制得新型三嵌段水凝胶P(AAPBA-co-DMAA-co-AAm), 与传统的两嵌段聚合物相比, 该凝胶具有良好的糖敏感特性, 在质量浓度200 mg/dL以上有较高的糖响应特性, 这一数值接近糖尿病病人的血糖阈值, 其溶胀度达10倍以上, 同时糖响应时间缩短到2~3 h. 振荡实验结果表明, 所得凝胶对糖呈现出良好的刺激-响应特性.

关键词 苯基硼酸 糖敏感 凝胶 溶胀 响应

分类号 0631

Preparation of Poly(3-acrylamidophenylboronic Acid-co-*N*,*N*-dime-thylacrylamide-co-acrylamide)hydrogels and Investigations on Their Sugar-sensitive Properties

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Abstract Glucose-sensitive porous poly(3-acrylamidophenylboronic acid-co-*N*,*N*-dimethylacrylamide-co-acrylamide)[P(AAPBA-co-DMAA-co-AAm)]hydrogels were prepared by radical copolymerization in dimethyl sulphoxide(DMSO) solution. At Physiological pH condition(pH 7.4, 37 ℃), the sensitivity of the Hdro gels to the sugar-concentration was investigated, and the influence of the component on the swelling ratio was studied at the same time. At the given range, with the increase of the contents of AAPBA and AAm in the gels. Compared with conventional bibloc k polymer, this hydrogel preserved an excellent sensibility to sugar-concentration and could response when the mass concentration of glucose is above 200 mg/dL, which approaches to diabetic's threshold of blood sugar. The swelling ratio of this hydrogel reached more than 10 times. At the same time, the response time to concentration of glucose decreased to 2—3 h. The results of surging experiment show the porous hydrogel possesses an excellent stimulate-response capability to sugar. Therefore, these novel porous Hdrogels have potential for the controlled release of drugs, especially for the micro molecular drugs.

Key words Phenylboronic acid Sugar-sensitivity Gel Swelling Responsivity

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