

研究论文

交联度对原位聚合法制备聚合物胶束性质的影响及相应的空心球制备

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摘要 用原位聚合法成功地制备出不同响应温度的温敏性聚乳酸/聚(异丙基丙烯酰胺-co-丙烯酰胺)[P(*D,L*-L A)/P(NIPAM-co-AM)]核壳胶束. 实验中发现, 壳层的交联剂含量对粒子的尺寸有很大的影响, 当交联剂的摩尔分数从5%提高到15%时, 粒子在25 °C时的流体力学直径从170.2 nm增加到886.5 nm. 通过对胶束粒子的核进行生物降解, 方便地得到了相应的空心球. 用FTIR监测核的降解过程, 用SEM和AFM检测核降解完全后粒子的外在形貌和内在结构变化. DLS结果表明, 空心球粒子同样具有良好的温度响应性, 其响应温度可通过改变原位聚合时单体AM的含量加以调节.

关键词 [高分子胶束](#) [大分子自组装](#) [高分子空心球](#) [壳交联](#)

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Effect of Crosslinker Content on the Properties of the Micelles Prepared *via in situ* Polymerization and Preparation of Hollow Spheres

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Abstract Tunable temperature-responsive poly(*D,L*-lactide acid)/poly(*N*-isopropyl acrylamide-co-acrylamide) (PLA/PNIPAM-co-AM) core-shell nanoparticles were prepared by *in situ* polymerization. It was found that the content of cross-linker has a great effect on the properties of the micelles, *i.e.*, the higher the cross-linker content is, the thicker the shell is. The hydrodynamic diameter of the nanoparticles increases from 170.2 nm to 886.5 nm at 25 °C when the crosslinker molar fraction increases from 5% to 15%. The corresponding hollow sphere could be obtained by the removal of the PLA core *via* biodegradation. FTIR was used to monitor the biodegradation and showed that the biodegradation is the reverse reaction of the step growth polymerization. The hollow structure was observed with AFM. The results of DLS also show that the hollow spheres possess the similar size dependent on the temperature as the parent core-shell nanoparticles do.

Key words [Polymeric micelles](#) [Macromolecular self-assembly](#) [Polymeric hollow sphere](#) [Shell cross linking](#)

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