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材料化学工程与纳米技术

淀粉丙烯酰胺表面控制反应机理及接枝产物结构表征

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摘要

以木薯淀粉和丙烯酰胺为主要原料，采用反相乳液聚合方法合成淀粉丙烯酰胺接枝共聚物，并通过红外光谱、电镜扫描、X射线衍射、热分析等手段对接枝共聚产物进行结构分析和聚合机理探讨。实验结果显示，淀粉与丙烯酰胺的反应主要发生在淀粉团粒表面，符合表面控制反应机理;接枝共聚物中含有淀粉和丙烯酰胺成分;共聚反应改变了原淀粉的聚集形态，接枝产物基本上为无定形的聚集态结构;但对淀粉的热稳定性影响不显著。

关键词

淀粉 接枝共聚物 反相乳液 机理 表征

分类号

Mechanism of surface control reaction and characterization of graft copolymers of acrylamide onto starch

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Abstract

The starch acrylamide graft copolymers (St-g-PAM) were synthesized by inverse emulsion polymerization with cassava starch and acrylamide as raw materials and ammonium persulfate as the initiator.The structures of St-g-PAM were characterized with Fourier transform infrared spectroscopy (FTIR), thermogravimetry (TG), differential scanning calorimetry (DSC), X-ray diffraction (XRD)and scanning electronic microscope (SEM).Meanwhile, the graft copolymerization mechanism in the inverse emulsion was discussed.The results showed that grafting copolymerization reaction occurred on the surface of the starch particle which was in agreement with the mechanism of surface control reaction.PAM grafted into the base of starch successfully, and the aggregation phase of raw starch was changed from semi-crystalline state to amorphous aggregation state due to the graft reaction of starch and acrylamide.However, the graft copolymerization of acrylamide onto starch did not alter the thermal stability of starch.

Key words

starch graft copolymer inverse emulsion mechanism characterization

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