

研究论文

新型疏水缔合聚合物P(AM/POEA)与表面活性剂的相互作用

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摘要 采用粘度法、荧光探针和透射电镜研究了新型疏水缔合聚合物P(AM/POEA)和表面活性剂SDS和CTAB在水溶液中的相互作用. 聚合物P(AM/POEA)结构中, 疏水体(2-苯氧乙基丙烯酸酯)呈嵌段状无序地分布在聚丙烯酰胺主链上. 这类聚合物很容易和表面活性剂相互作用, 通过疏水缔合, 形成混合胶束状聚集体, 导致溶液粘度剧增. 随聚合物溶液中SDS的加入, 溶液粘度发生大幅度起伏变化, 出现最大值. 粘度最大值对应的表面活性剂浓度 $c_{S,max}$ 位于表面活性剂CMC附近, 并发现它的位置不随聚合物微结构而变化.

然而它们缔合作用的增粘程度却与聚合物疏水体含量 X_H 及疏水嵌段尺寸 N_H 有关. 在实验浓度范围内, X_H 和 N_H 愈大, 溶液的粘度越高. 此外用透射电镜直接观察到聚合物/表面活性剂体系中聚集体的交联结构形貌.

关键词 [聚合物P\(AM/POEA\)](#) [聚合物/表面活性剂体系](#) [疏水缔合](#) [微结构](#) [粘度](#)

分类号

Interaction of Novel Hydrophobically Associating Polymer P(AM/POEA) with Surfactant in Aqueous Solution

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Abstract The interactions between novel hydrophobically associating copolymer P(AM/POEA) and surfactants (SDS and CTAB) were studied in aqueous solution using viscometry, fluorescence probe and transmission electronic microscopy (TEM). The structure of the P(AM/POEA) consists of randomly distributed blocks of hydrophobe, 2-phenoxyethyl acrylate (POEA) in the polyacrylamide backbone. The polymer of this type easily interacts with surfactants SDS and CTAB through hydrophobic association to form a mixed micelle-like aggregate, resulting in a large viscosity enhancement. With the addition of SDS to the polymer solution, the viscosity varied dramatically and a pronounced maximum appeared at surfactant concentration around its CMC, which was found to be independent of the microstructure of polymer. However, their degree of associative thickening behavior was closely related to the hydrophobe content X_H and block size N_H of polymer. The larger the X_H or N_H , the higher the viscosity within the experimental concentration range. The morphology of the network structure for polymer/surfactant aggregates was also directly observed by TEM.

Key words [copolymer P\(AM/POEA\)](#) [polymer/surfactant system](#) [microstructure](#) [viscosity](#) [hydrophobic association](#)

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