

论文

聚丙烯酰胺对草酸钙结晶的调控作用

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摘要 采用扫描电子显微镜(SEM)和X射线粉末衍射(XRD)等方法, 研究了聚丙烯酰胺(PAM)对草酸钙形貌和晶相的调控作用, 讨论了聚丙烯酰胺浓度、溶液pH和草酸钙过饱和度变化对草酸钙结晶的影响. PAM可以诱导二水草酸钙(COD)晶体生成并改变COD和一水草酸钙(COM)晶体的形貌. 加入5.0g/L的PAM后, 不但诱导了30%(w/w)的COD晶体形成, 出现了较为少见的COD聚集体, 而且使得COM晶体的棱角圆钝. 从PAM的分子结构、不同pH条件下PAM的水解差异、PAM中羧基与钙离子相互作用、

PAM与COM表面Ca²⁺的络合-离解平衡、静电作用等角度讨论了上述结果, 表明通过改变实验条件, 可制备出不同晶相和形貌的草酸钙晶体.

关键词 [聚丙烯酰胺](#) [草酸钙](#) [结晶](#)

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Modulation of Polyacrylamide on Phases Compositions of Calcium Oxalate in Aqueous Solutions

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Abstract The modulation of polyacrylamide (PAM) on the morphology and phase compositions of calcium oxalate crystals was investigated by means of scanning electron microscopy and X-ray powder diffraction. The effects of the concentration of polyacrylamide, pH value in solution and the supersaturation of calcium oxalate on the crystallization of calcium oxalate were discussed. PAM can induce the formation of calcium oxalate dihydrate(COD) crystals and change the morphology of COD and calcium oxalate monohydrate (COM) crystals. In the presence of 5.0g/L of PAM, about 30 percentage (w/w) COD crystals were induced, the aggregated COD crystals were observed, and the shapes of COM crystals were changed from elongated, twinned and aggregated to oval. These results were discussed from the points of molecular structure of PAM, the hydrolysis difference of PAM at various pH values, the interaction between the carboxylic groups of PAM and Ca²⁺

in solution, the complexation-dissociation balance between the PAM and Ca²⁺ ions on the surface of COM crystals, and electrostatic interaction etc. The results obtained show that by changing the experimental conditions calcium oxalate crystals with various phase and morphologies can be prepared.

Key words [polyacrylamide](#) [calcium oxalate](#) [crystallization](#)

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