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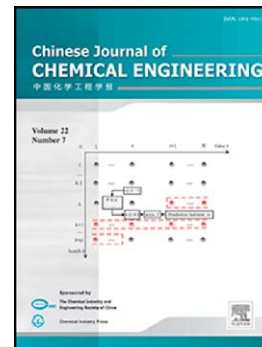
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Hydrothermal Synthesis of Calcium Sulfate Whisker from Flue Gas Desulfurization Gypsum

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Abstract Plenty of flue gas desulfurization (FGD) gypsum generated from coal-fired power plants for sulfur dioxide sequestration caused many environmental issues. Preparing calcium sulfate whisker (CSW) from FGD gypsum by hydrothermal synthesis is considered to be a promising approach to solve this troublesome problem and utilize calcium sulfate in a high-value-added way. The effects of particle size of FGD gypsum, slurry concentration, and additives on CSW were investigated in this work. The results indicated that fine particle size of FGD gypsum and moderately high slurry concentration were beneficial for crystal nucleation and growth. Three additives of magnesium chloride, citric acid, and sodium dodecyl benzene sulfonate (SDBS) were employed in this study. It was found that mean length and aspect ratio of CSW were both decreased by the usage of magnesium chloride, while a small quantity of citric acid or SDBS could improve the CSW morphology. When multi-additives of citric acid-SDBS were employed, the mean length and aspect ratio increased more than 20%. Moreover, surface morphology of CSW went better, and the particle size and crystal shape became more uniform.

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