系统与集成

Fractal Geometry of Particle Aggregates Formed in Calcium Sulfite Slurry

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摘要　　The solid-liquid separation is an important operation for the regenerated slurry of dual-alkali FGD system, and calcium sulfite could predominate in particle aggregates of the slurry. The settling velocity of calcium sulfite particles is a key parameter for the solid-liquid separation design. However, the settling velocity predicted by Stokes' Law could be suitable only for a spherical aggregate, but not for the irregular one. In this work, fractal geometry was introduced in order to characterize highly irregular geometric shapes. The sizes of calcium sulfite particle aggregates were analyzed using a metallographic phase microscope and image analysis. The results showed that particle aggregates had fractal features. The fractal dimensions could reveal the characteristics of the aggregates' geometry and aggregation process. An exponential relation between the fractal dimension D_2 and the particle size l was determined as $A\mu lD2$. According to fractal theory, a parameter can be used to modify Stokes settling velocity close to actual settling velocity. The results could be valuable for the design of solid-liquid separation processes.

关键词　　sedimentation,fractal geometry,Stokes' Law,dual-alkali FGD

分类号

DOI:

对应的英文版文章: 205255

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