



## 论文摘要

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## 纳米TiO<sub>2</sub>添加FCC大颗粒的流化性能

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**摘要:** 通过添加较大粒径的催化裂化催化剂(FCC)颗粒来改善纳米TiO<sub>2</sub>的流化性能, 测量床层压降和床层膨胀曲线, 研究添加颗粒的添加量以及粒径对流化质量的影响, 并用R-Z方程对流化后的体系散式化程度进行分析。研究表明: FCC颗粒的添加量达到30%后可以显著改善纳米TiO<sub>2</sub>的流化质量; 当添加量增大到40%时, 压降曲线更平滑, 最小流化速度减小, 床层膨胀比增大, 散式化程度升高; FCC颗粒的粒径越小, 流化效果越好; 当粒径为109-120 μm的FCC添加量为30%时, 实现完全流化; 当粒径为96-109 μm的FCC添加量为20%, 气速为11.04 mm/s时, 床层基本实现完全流化, 偶尔有少量沉积; 而当粒径为75-80 μm的FCC添加量为20%时, 气速约为94.32 mm/s即可以实现完全流化。

**关键字:** 纳米TiO<sub>2</sub>; 流态化; 颗粒; 床层压降; 最小流化速度

## Fluidization characteristics of TiO<sub>2</sub> nano-particles by adding FCC particles

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**Abstract:** The fluidization experiments of TiO<sub>2</sub> nano-particles by adding FCC coarse particles were carried out. The curves of bed pressure drop and bed expansion were measured. The effect of the size and adding amount of FCC additive particles on fluidization behavior of TiO<sub>2</sub> nano-particles was investigated. R-Z equation was used to check the mixture systems of TiO<sub>2</sub> nano-particles and FCC particles. The results show that the fluidization quality of TiO<sub>2</sub> nano-particles can be greatly improved by adding 30% FCC coarse particles. When the adding amount increases to 40%, the pressure drop curves become smoother, the minimum fluidized velocity decreases, bed expansion rises and the fluidization characteristics of agglomerate particle are better. Decreasing the size of FCC particles, the same results are obtained. Adding 109-120 μm FCC 30%, the mixture is in a good fluidization. The mixture adding amount of 20% FCC with 96-109 μm can be fluidized and gas velocity reaches 11.04 mm/s. With the same adding amount, the mixture adding 75-80 μm FCC is fluidized and the gas velocity is 94.32 mm/s.

**Key words:** TiO<sub>2</sub> nano-particles; fluidization; particles; pressure drop; minimum fluidized velocity

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