

## 新型填料特性及其在生物脱硫中的应用

Characteristics of a new packing material and its application in biodesulfurization

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中文摘要:

为解决生物脱硫反应器酸化问题, 研制出一种具有pH缓冲能力的生物填料。填料主要由碳酸钙、纯丙乳液和羟丙基纤维素制得。填料在水中浸泡6个月不会分解, 吸水率大于20%。考察填料pH缓冲能力, 结果表明, 填料能将pH=5.0水溶液调节至pH=6.5以上。选取缓冲能力较稳定的BT50填料填充于反应器, 以排硫硫杆菌 (*Thiobacillus thiooparus*) 挂膜, 5个循环后反应器有效体积内的最大固定化菌体数量约为 $5.86 \times 10^8$  cells/mL, 并且硫代硫酸钠的消耗速率基本稳定, 表明该填料可用于生物挂膜。在长达50 d脱硫实验中, H<sub>2</sub>S脱除率均在95%以上, 整个脱硫阶段不再加入任何pH调节剂, 反应器内pH仍能维持在6.7~7.1之间。

英文摘要:

The main objective of this work was to propose a new packing material, which could provide a better buffering capacity. The material composed of calcium carbonate, an organic binder and hydroxypropyl cellulose was made. Moisture retention capacity was higher than 20%, and water cohesion capacity lasted for more than six months. Buffering capacity investigated in liquid experiments showed that the packing material could buffer pH from 5.0 to 6.5. BT50 was chosen and tested to achieve immobilization cycles using *Thiobacillus thiooparus*. In this process, the material maintained a neutral pH which is an optimum condition for bacterial growth. A total of 10 immobilization cycles were performed with a total duration of 240 h. After 5 cycles, the maximum number of bacteria immobilized by this technique was reached, and the substrate consumption rate achieved stability. The total quantity of biomass immobilized was  $5.86 \times 10^8$  cells/mL. A total of desulfurization process maintained at 50 days, H<sub>2</sub>S removal rate was above 95% with different concentrations of H<sub>2</sub>S, and the pH of medium was 6.7~7.1.

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