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Hydrogen Sulfide Removal by Catalytic Oxidative Absorption Method Using Rotating Packed Bed Reactor*

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Abstract Using catalytic oxidative absorption for H_2S removal is of great interest due to its distinct advantages. However, traditional scrubbing process faces a great limitation in the confined space. Therefore, there is an urgent demand to develop high-efficiency process intensification technology for such a system. In this article, H_2S absorption experimental research was conducted in rotating packed bed (RPB) reactor with ferric chelate absorbent and a mixture of N_2 and H_2S, which was used to simulate natural gas. The effects of absorbent pH value, gas-liquid ratio, gravity level of RPB, absorption temperature and character of the packing on the desulfurization efficiency were investigated. The results showed that H_2S removal efficiency could reach above 99.6% under the most of the experimental condition and above 99.9% under the optimal condition. A long-time continuous experiment was conducted to investigate the stability of the whole process combining absorption and regeneration. The result showed that the process could well realize simultaneous desulfurization and absorbent regeneration, and the H_2S removal efficiency kept relatively stable in the whole duration of 72 hours. It can be clearly seen that high gravity technology desulfurization process, which is simple, high-efficiency, and space intensive, has a good prospect for industrial application of H_2S removal in confined space.

Keywords confined space, RPB, desulfurization, catalytic oxidative, absorption

1 INTRODUCTION

As environmental pollution is becoming more and more serious, replacing coal by natural gas

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