

魏凤玉,何园.N,N'-二(2-羟丙基)哌嗪-H<sub>2</sub>SO<sub>4</sub>水溶液吸收SO<sub>2</sub>动力学[J].环境科学学报,2013,33(8):2143-2148

### N,N'-二(2-羟丙基)哌嗪-H<sub>2</sub>SO<sub>4</sub>水溶液吸收SO<sub>2</sub>动力学

#### Kinetics of absorption of SO<sub>2</sub> into N,N'-bis(2-hydroxypropyl) piperazine and sulfuric acid aqueous solution

关键词: [N,N'-二\(2-羟丙基\)哌嗪](#); [初始速率法](#); [反应动力学](#); [吸收速率](#)

基金项目: [安徽省重点科技攻关项目\(No.08010202124\)](#)

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摘要: 在鼓泡式反应器中,以N,N'-二(2-羟丙基)哌嗪(HPP)-硫酸水溶液为吸收剂,利用初始速率法探讨了SO<sub>2</sub>吸收反应动力学.结果表明:HPP-H<sub>2</sub>SO<sub>4</sub>水溶液吸收SO<sub>2</sub>为快速反应;吸收速率 $N_A$ 随着SO<sub>2</sub>进口体积浓度 $y_A$ 和吸收剂浓度 $C_N$ 的增大而增大,随着吸收温度 $T$ 的升高而降低;吸收速率对 $C_N$ 是0.5级反应,对 $y_A$ 为0.85级反应.同时,建立了HPP-H<sub>2</sub>SO<sub>4</sub>水溶液吸收SO<sub>2</sub>的吸收速率 $N_A$ 与 $C_N$ 、 $y_A$ 及 $T$ 之间的经验关系式,发现该经验关系式的预测值与实验值符合较好,可用于工程设计计算.

**Abstract:** The aqueous solution of N, N'-bis (2-hydroxypropyl) piperazine (HPP) was used as an absorbent for SO<sub>2</sub> in a bubbling device. The initial rate was used to determine the absorption reaction kinetics of SO<sub>2</sub>. The results showed that the reaction of SO<sub>2</sub> into the aqueous solution of HPP-sulfuric acid is a fast reaction. The absorption rate ( $N_A$ ) increased with SO<sub>2</sub> concentration in inlet gas ( $y_A$ ) and the absorbent concentration ( $C_N$ ), but decreased with absorption temperature  $T$ . The absorption rate was found to be 0.5 and 0.85 order with respect to  $C_N$  and  $y_A$ , respectively. An empirical correlation of  $N_A$  was subsequently developed as a function of  $C_N$ ,  $y_A$  and  $T$ , and the absorption rate was calculated. The obtained data were found to be in a good agreement with the experimental absorption rate and hence the empirical correlation could be used for engineering design.

**Key words:** [N,N'-bis\(2-hydroxypropyl\) piperazine](#); [initial rate](#); [reaction kinetics](#); [absorption rate](#)

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