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Optimization of Effecting Parameters for the Removal of H_2S Gas in Self Priming Venturi Scrubber Using Response Surface Methodology

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Abstract : Highly toxic and corrosive gas H_2S is recognized as one of the hazardous air pollutants which has significant effect on the human health. Abatement of H_2S gas from the air is very necessary. H_2S gas is mainly released from the industries like paper and leather industry as well as during the production of crude oil, during wastewater treatment, etc. But the emission of H_2S gas in high concentration may cause immediate death while at lower concentrations can cause various respiratory problems. In the present study, self priming venturi scrubber is used to remove the H_2S gas from the air. Response surface methodology with central composite design has been chosen to observe the effect of process parameters on the removal efficiency of H_2S. Experiments were conducted by varying the throat gas velocity, liquid level in outer cylinder, and inlet H_2S concentration. ANOVA test confirmed the significant effect of parameters on the removal efficiency. A quadratic equation has been obtained which predicts the removal efficiency very well. The suitability of the developed model has been judged by the higher R^2 square value which obtained from the regression analysis. From the investigation, it was found that the throat gas velocity has most significant effect and inlet concentration of H_2S has less effect on H_2S removal efficiency.

Keywords : desulfurization, pollution control, response surface methodology, venturi scrubber
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