

Experimental studies on the simultaneous removal of NO_x and SO_x using a chelate solution

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The emissions of nitrogen oxides (NO_x) and sulfur oxides (SO_x), which have negative effects on the human body and the environment, have been more strictly controlled. Selective Catalytic Reduction (SCR), the most widely used technology for NO_x removal, has certain drawbacks such as relatively high capital cost and concerns about the use of toxic ammonia and urea. Wet absorption methods with chelate solutions such as Fe(II) EDTA to overcome the poor solubility of NO have been proposed as a promising alternative to SCR. Although Fe(II)EDTA coordinates with NO efficiently, Fe(II)EDTA is easily oxidized to Fe(III)EDTA that loses its ability to absorb NO in the presence of oxygen. In the present work, the newly developed chelate solution can rapidly reduce metal ions of the chelate and shows high NO removal efficiency even in the presence of oxygen. Experimental studies on NO removal were performed using a glass bubble reactor to determine the capacity of the solution under various conditions. The new solution was compared to Fe(II)EDTA with respect to the effects of O₂, SO₂ and pH on NO removal efficiency. These could be used to find the optimal wet scrubber solution.