

# Mass transfer and reaction kinetics of sulfuryl fluoride absorption with aqueous sodium hydroxide solutions

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# Contents

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## Key objective

To determine the mass transfer and reaction kinetics zone of sulfuryl fluoride absorption with aqueous sodium hydroxide solutions and obtain the expression of enhancement factor

## Key methodology

Using the experimental double-stirred cell used for the absorption measurements, which is equipped with the constant effective interfacial area

## Major aspects investigated

1. To investigate mass transfer and reaction kinetics zone of sulfuryl fluoride absorption with aqueous sodium hydroxide solutions
2. To study enhancement factor  $E$  for the chemical absorption of sulfuryl fluoride with sodium hydroxide solutions
3. To determine the forward second-order rate constant  $k_2$  for the hydrolysis reaction of sulfuryl fluoride

# Key conclusions (1)

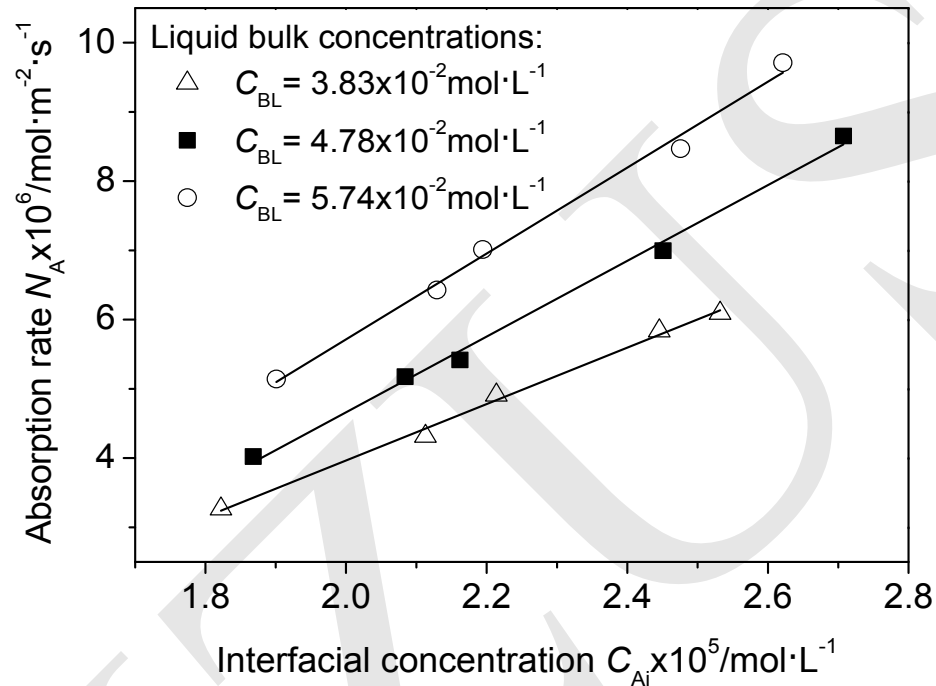


Fig. 2 The effect of the bulk concentration of NaOH on the  $\text{SO}_2\text{F}_2$  absorption rate as a function of the interfacial concentration of  $\text{SO}_2\text{F}_2$  in the liquid phase

**Conclusion:** Sulfuryl fluoride ( $\text{SO}_2\text{F}_2$ ) absorption with sodium hydroxide (NaOH) was a fast pseudo-first-order reaction. The second-order rate constant was determined from experimental results and found to be  $1.44 \text{ m}^3 \cdot \text{mol}^{-1} \cdot \text{s}^{-1}$  at 298 K.

# Key conclusions (2)

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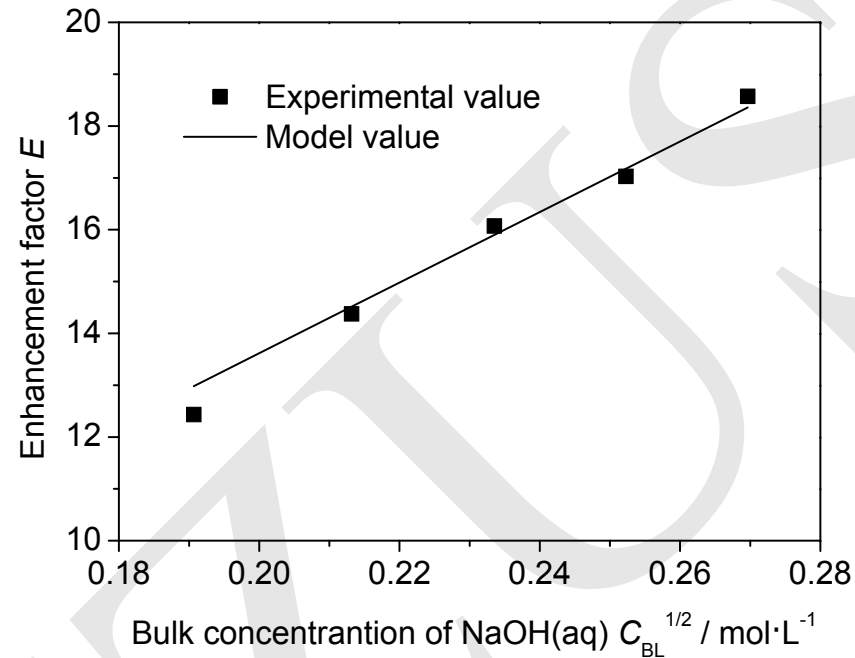


Fig. 3 Comparison of experimental and model value for the enhancement factor

**Conclusion:** A comparison was made between the experimental enhancement factor and the data calculated from the models, the maximum relative deviation was less than 4.2%. The corresponding mathematical expression of enhancement factor in our case is as follows:  $E=68.08C_{BL}^{1/2}$ .