

## Kinetic / VLE set-up Double cell

### Purpose

Acid gases can be removed from industrial gas streams with a chemical and/or physical solvent. In this experimental set-up both the reaction kinetics as the acid gas solubility (VLE) can be determined for these gas treating processes. In the double cell set-up kinetics and VLE can be measured at very low acid gas partial pressure ( $0.1 \text{ mbar} < P_{\text{acid gas}} < 100 \text{ mbar}$ ). The solvent is supplied to both reactors, which are operating at exactly the same temperature. The acid gas is added to one reactor only. From the pressure difference between both reactors, the acid gas partial pressure is derived.

### Acid gases

- carbon dioxide, hydrogen sulphide, carbonyl sulphide, mercaptans (methyl- upto pentylmercaptans)

### Solvents

- (alkanol)amines, alkaline salts, amino acid salts, ammonia, physical solvents.

### Picture



### Specifications

$0.1 \text{ mbar} < P_{\text{acid gas}} < 100 \text{ mbar}$   
 $P < 5 \text{ bar}$   
 $5 < T < 95 \text{ }^\circ\text{C}$   
 Charge quantity:  $\pm 2 \times 500 \text{ ml}$

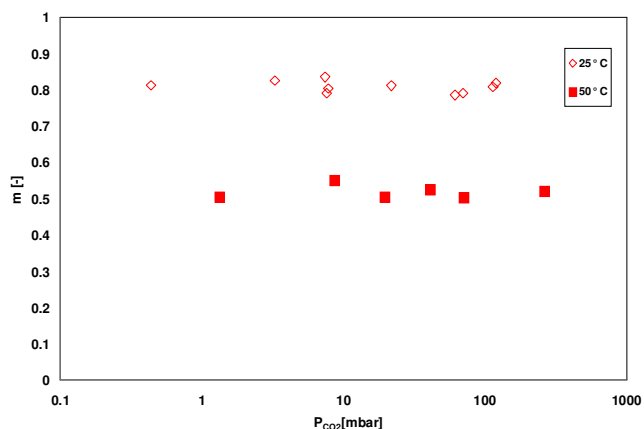


Figure: Solubility of  $\text{CO}_2$  in water at low partial pressure

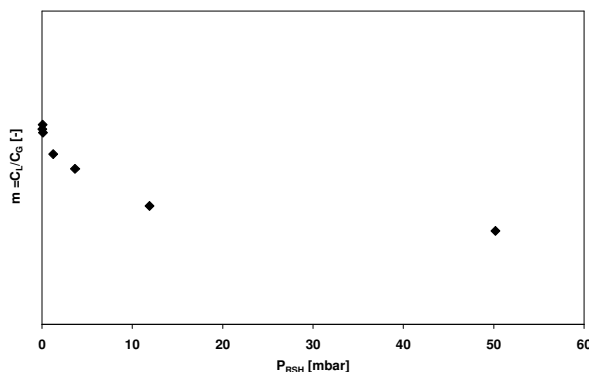


Figure: Solubility of alkylmercaptan in aqueous alkanolamine

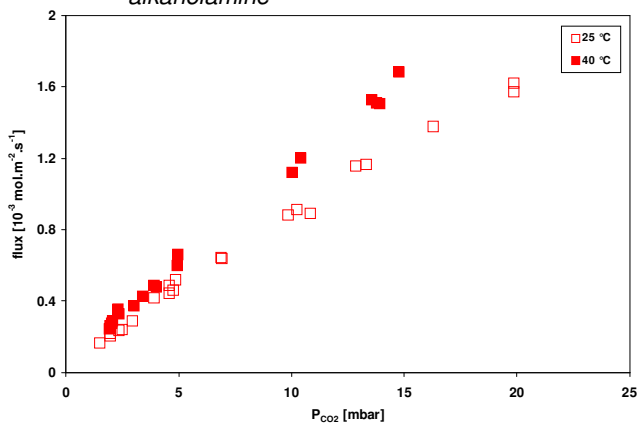


Figure: Absorption flux in 1 M aqueous NaOH as function of  $\text{CO}_2$  partial pressure (ref. 1)

Ref.1 P.W.J. Derks, PhD thesis, Twente University 2006

### Contact

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