

A vertical decorative strip on the left side of the slide, divided into four horizontal sections: the top section shows colorful jelly beans, the middle section shows a fire burning in a hearth, the bottom section shows a green leaf with the chemical formula "CO2" written on it, and the bottom-most section shows a blue and white striped pattern.

Ultrasonic Intensification of CO₂ Stripping

(Ultra Stripping)

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June, 2016

Basics

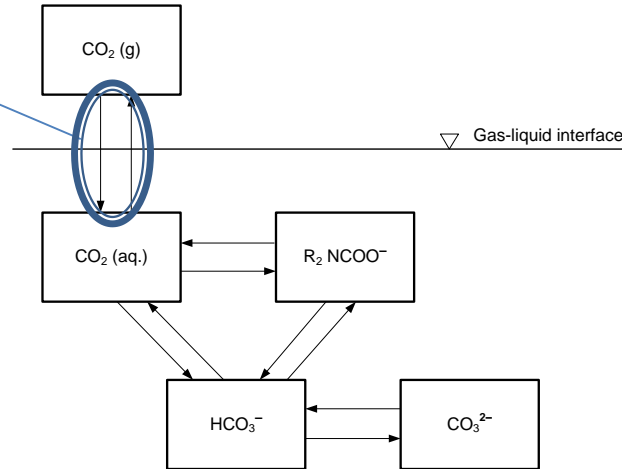
■ Bubble surface

$$P_s = \frac{2S}{R}$$

very large for small bubbles

■ Cavitation promoted by ultrasonics

Primary
equilibrium
affected



EQUILIBRIUM SYSTEM(S)

Test Rig

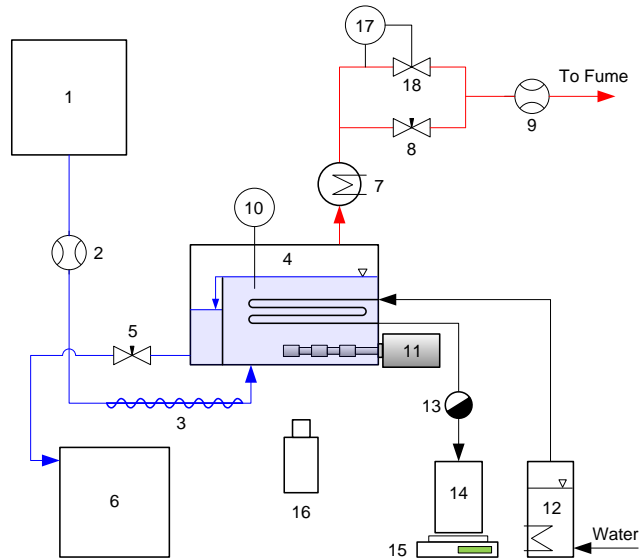


Figure 1. Schematic diagram of the reboiler rig with ultrasonics.

- 1, Rich amine feed tank; 2, Liquid flow meter; 3, Preheat unit; 4, Glass kettle reboiler; 5, Needle valve;
6, Lean amine receiving tank; 7, Gas-liquid separator; 8, Needle valve; 9, CO₂ flow meter;
10, Various sensors (P, T) in liquid and gas; 11, Ultrasound unit; 12, Electric steam generator; 13, Steam trap;
14, Condensed steam receiving tank; 15, balance; 16, High speed camera; 17, Pressure controller; 18, Solenoid valve.
(Blue line is liquid phase and red line is gas phase)

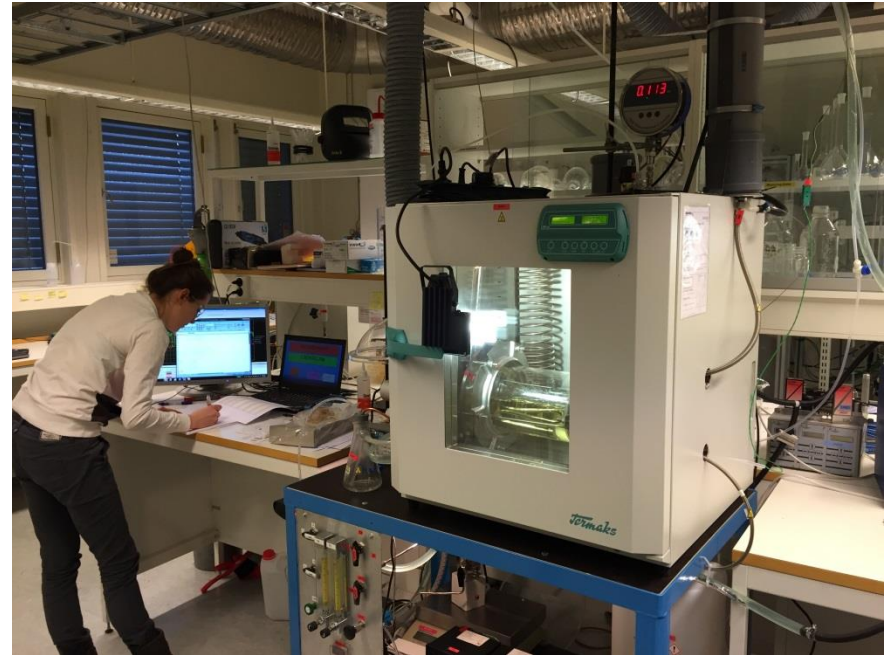
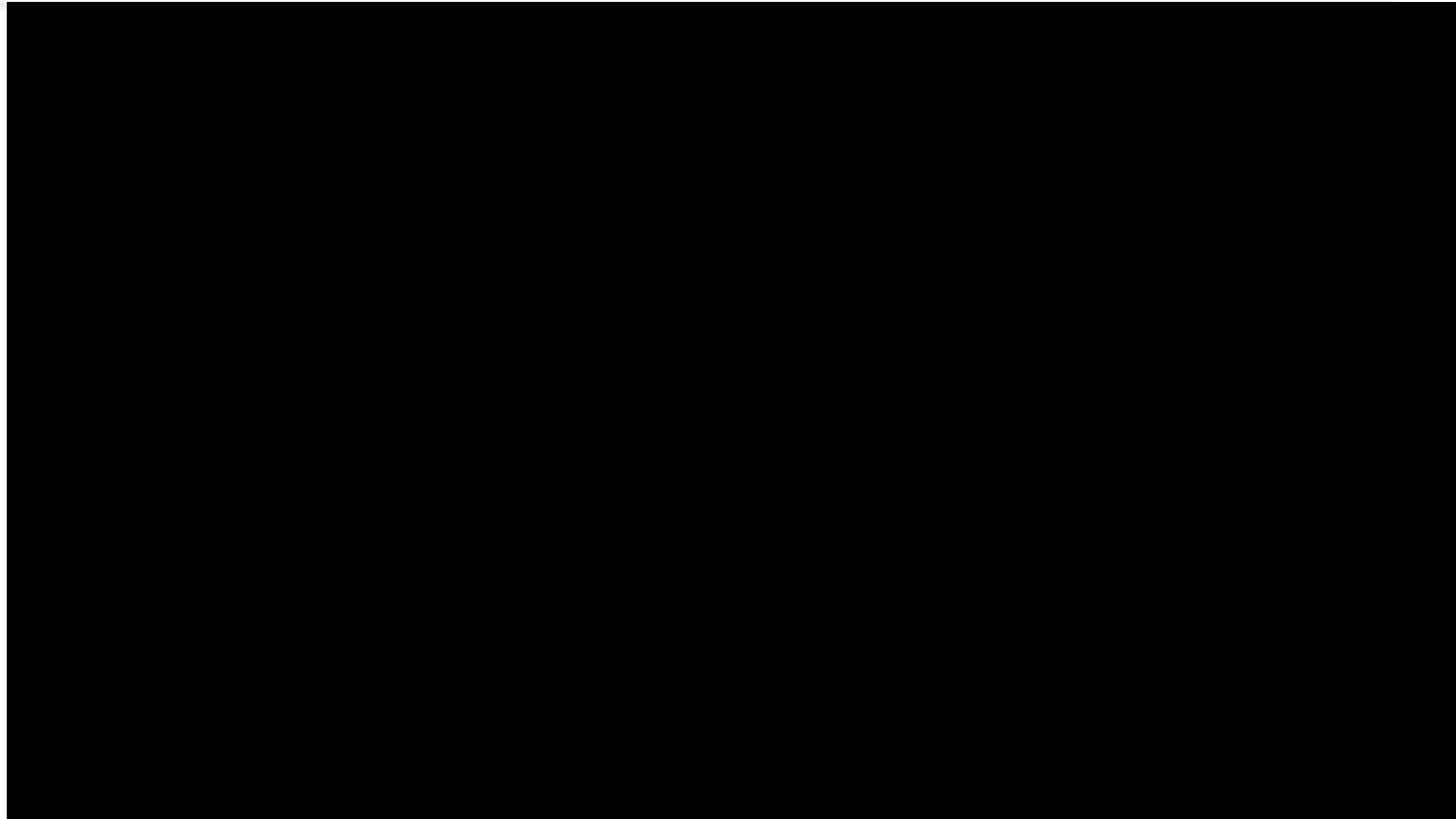


Figure 2. Photo of the rig

Typical Experimental Video (On/Off valve P control)

- $P=0.5$ bara
- $\alpha=0.25$
- $f=28\text{k}$ 1/s
- $I=425\text{w}$
- $t_{\text{on}}=1$ s
- $t_{\text{off}}=3$ s



Key Figures

- Specific energy saving
- Improved recovery
 - Leading to savings due to lower circulation rate
- Rate of CO₂ stripping in reboiler increased by
 - 5 x

Close to industry

