ATBEST

Novel technologies for integrated biogas separation and compression

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Biogas separation and compression

- **biogas separation technology**

➢high scrubbing efficiency of the process
➢low energy requirements
➢low total capital equipment cost
➢low absorbent cost

the most important solvent selection criteria

➢high working capacity
➢low regeneration temperature
➢low heat of absorption and vaporization
➢low viscosity
➢other physico-chemical parameters

Biogas compression(have small-scale units)

➢demand less process equipment
➢provide favorable economics
➢high levels of CO_2 removal

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New absorption solutions have been developed

- Aqueous amine solutions blended with piperazine (PZ)
- Different ionic liquids
- Ionic liquid–amine mixtures
- Aqueous amino acid salts

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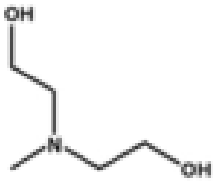
Aqueous alkanolamine solutions with activators

Primary alkanolamine:

Monoethanolamine
(MEA)

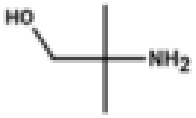
Tertiary alkanolamine:

N-Methyldiethanolamine
(MDEA)



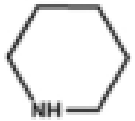
Sterically Hindered Amine (SHA):

2-Amino-2-methyl-1-propanol
(AMP)



Cyclical amines (activators):

Piperidine
(PIP)



Piperazine
(PZ)

Piperazinyl-1,2 ethylamine
(PZEA)

My solvents : MDEA+PZ

Volume Fraction :
35%MDEA + 5%PZ + 60%H_2O

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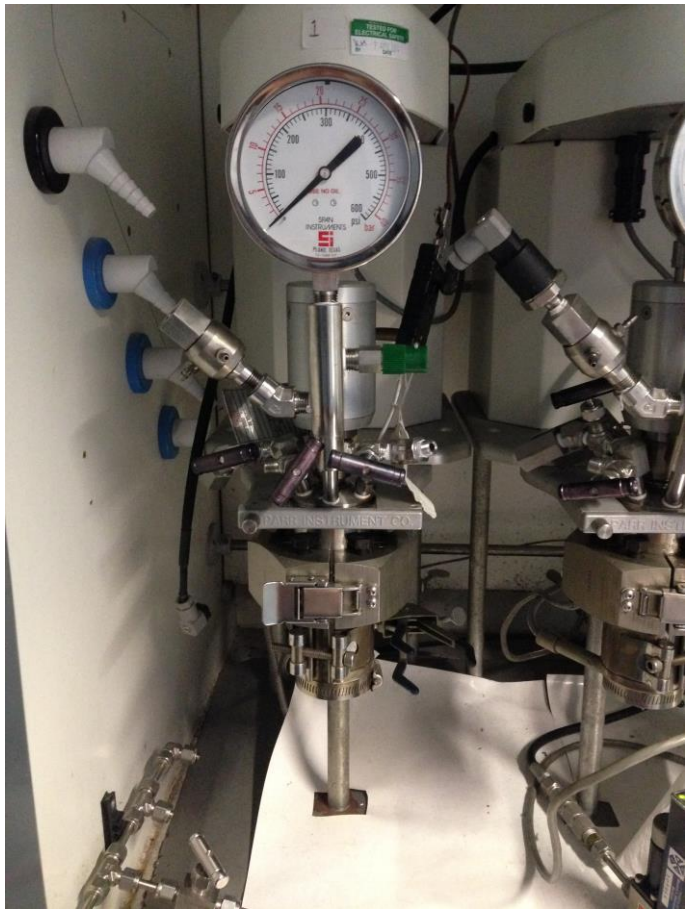
Absorption and desorption apparatus



reactor

Wiped-film evaporator

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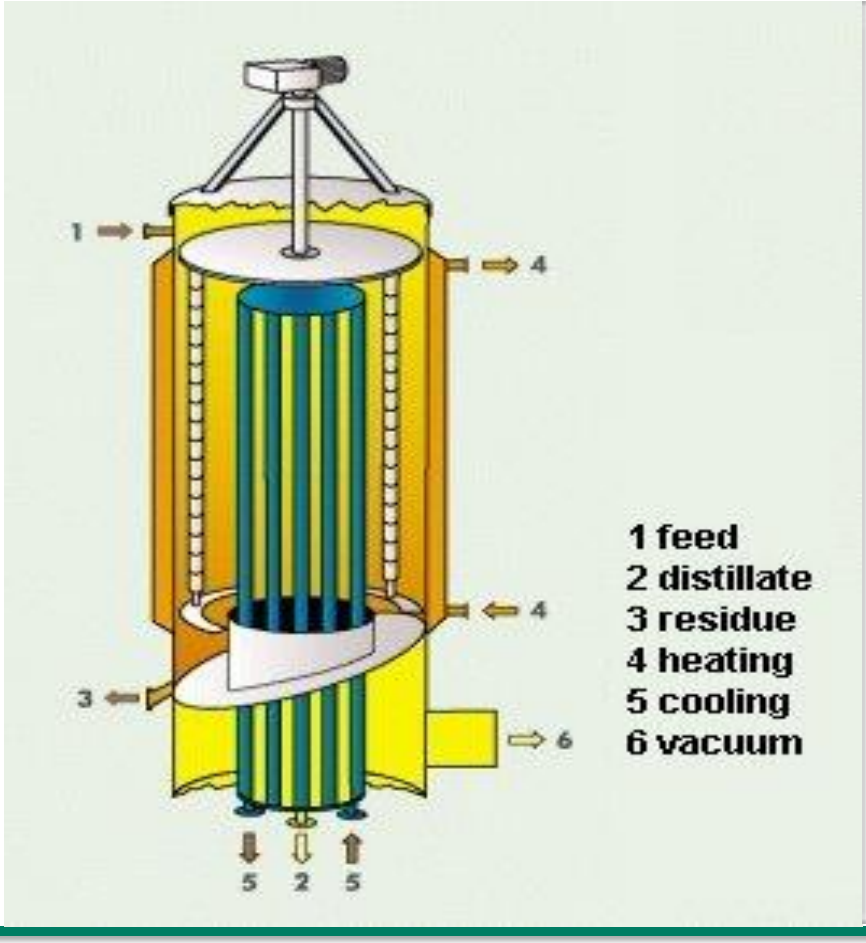
Wiped-film evaporator



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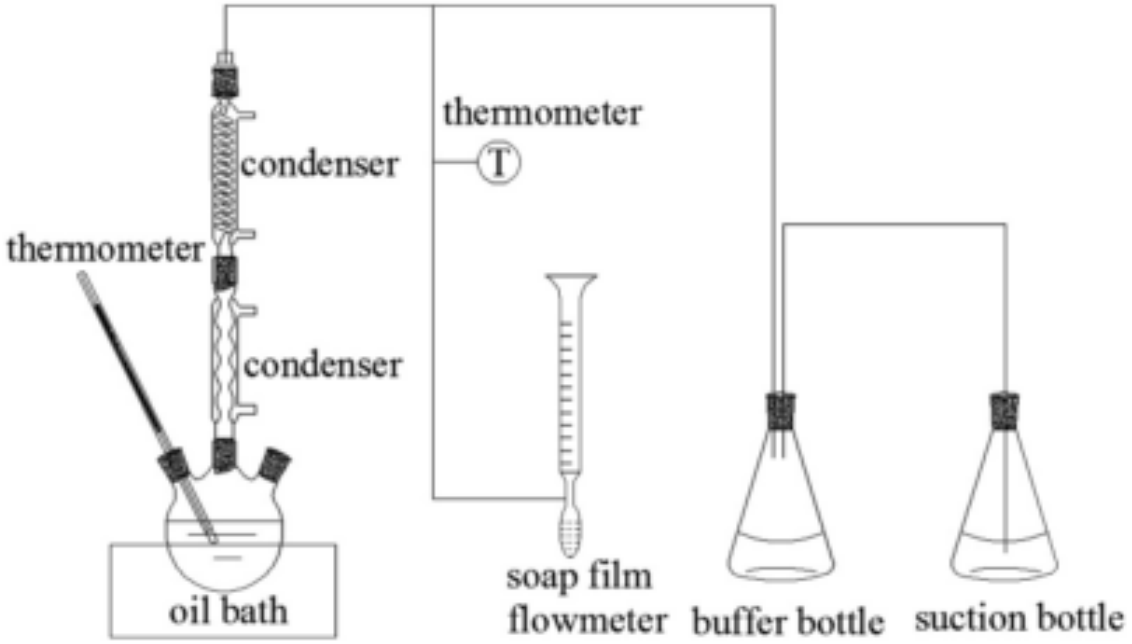
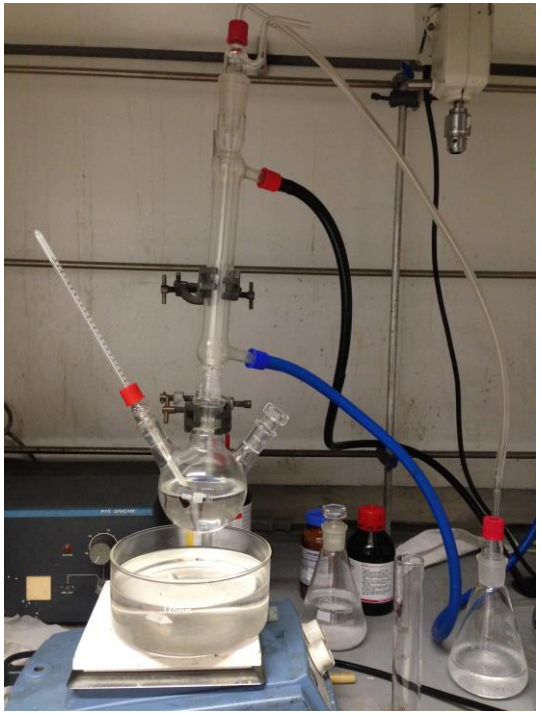
Desorption apparatus





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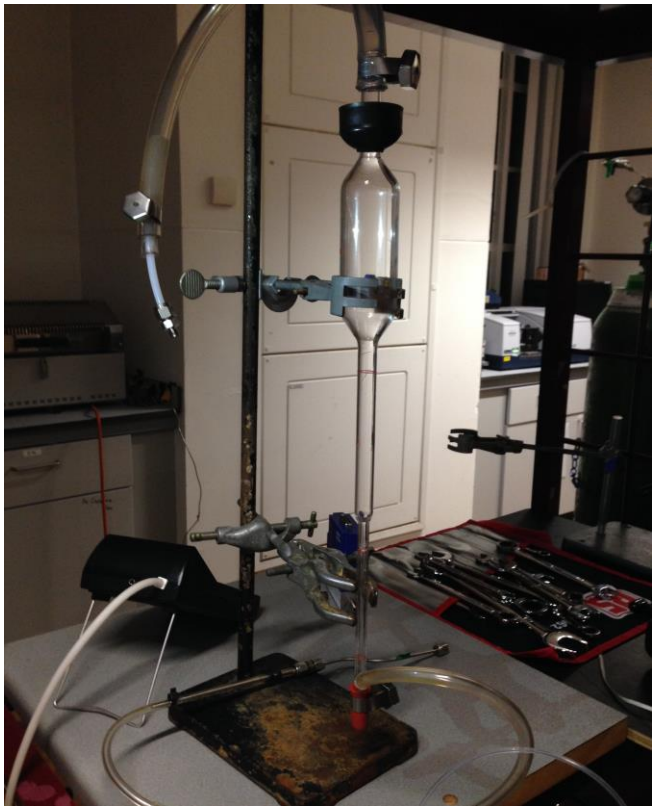
Analyzer



Soap-film meter

gas analyzer

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Future work: modeling

Modern computer technology has made it possible to use kinetics of CO_2 desorption and mass transfer rate-based models to simulate almost any type of gas treating systems and design small scale units

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Thanks for listening

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