

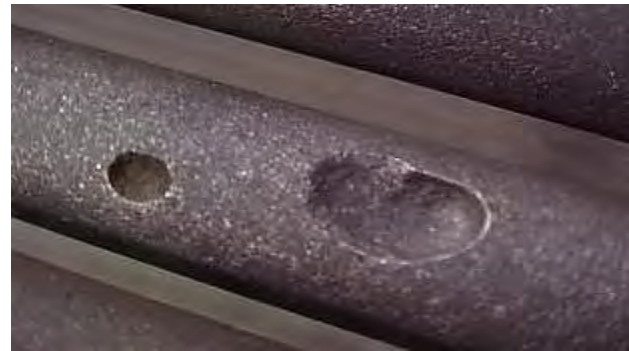
Acid Gas Separation

Topics

- Why remove CO₂?
- CO₂ Removal Technologies

Why Remove CO₂?

- Corrosion
 - In presence of water, CO₂ forms carbonic acid, which is very corrosive to steel



Why Remove CO₂?

- Reduces pipeline capacity
 - Example: 200 MMSCFD, 40% CO₂ stream needs a 16" Pipe. If CO₂ reduced to 5%, then 12" is sufficient
- Increases compression duty
- Decreases Gas Heating Value
- CO₂ freezing in NGL production
- CO₂ may be a useful product

Topics

- Why remove CO₂?
- CO₂ Removal Technologies

CO₂ Removal Technologies

- Cryogenic Distillation
- Adsorption
- Chemical Absorption
- Physical Absorption
- Membrane Separation

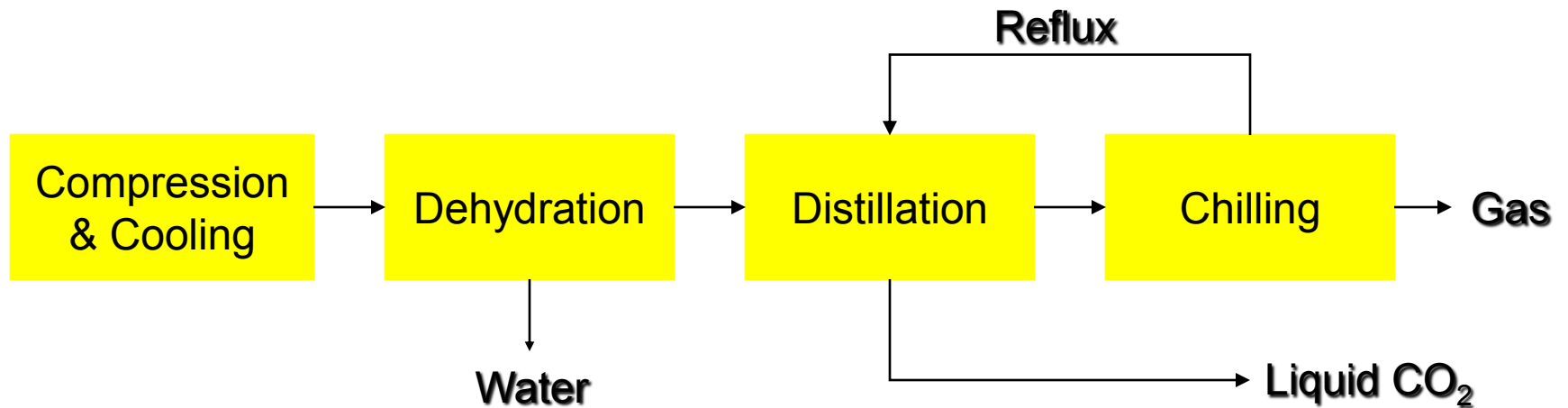
CO₂ Removal Technologies

- Cryogenic Distillation
- Adsorption
- Chemical Absorption
- Physical Absorption
- Membrane Separation

Cryogenic Distillation

- Deep chilling of gas
 - Provides liquid CO₂ Product
 - Energy intensive
- Requires dehydration to prevent freezing
- Preferred if CO₂ can be sold
 - Produces up to 99.998% CO₂ purity
- Large plot area & weight
- Little offshore use

Cryogenic Distillation



CO₂ Removal Technologies

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Adsorption

- Regenerative CO₂ removal by using Molecular Sieves.
- Peak shaving and small LNG plant applications.
- Used for bulk removal as well as polishing.



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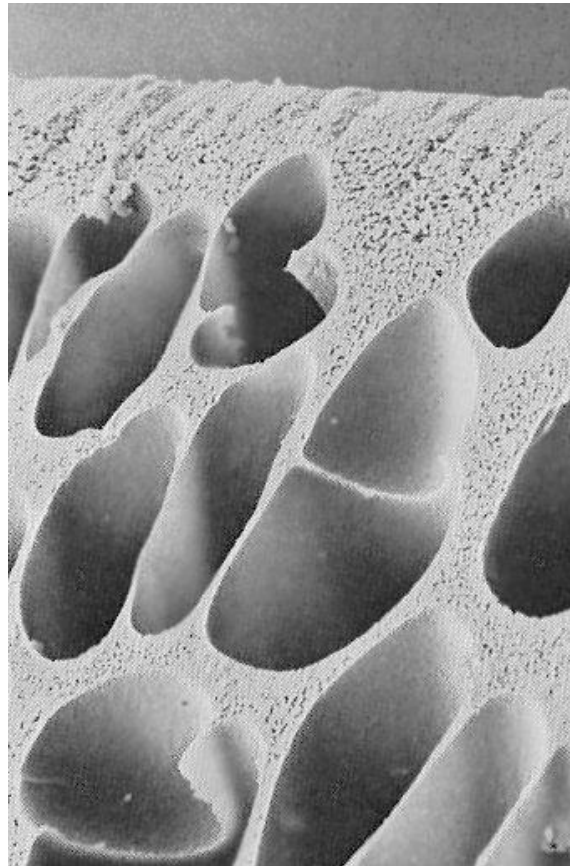
Absorption

- Chemical Absorption
 - Amines, Potassium carbonate
 - CO₂ Reacts with solvent
 - Temperature or pressure-based solvent regeneration
- Physical Absorption
 - Selexol[®], Ifpexol[®], Fluor[®] Solvent, Methanol
 - Solvent has an affinity for CO₂
 - Also has affinity for C₃+ hydrocarbons (lost with CO₂)

CO₂ Removal Technologies

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Typical Membrane Structure



O&GBISS BVBA

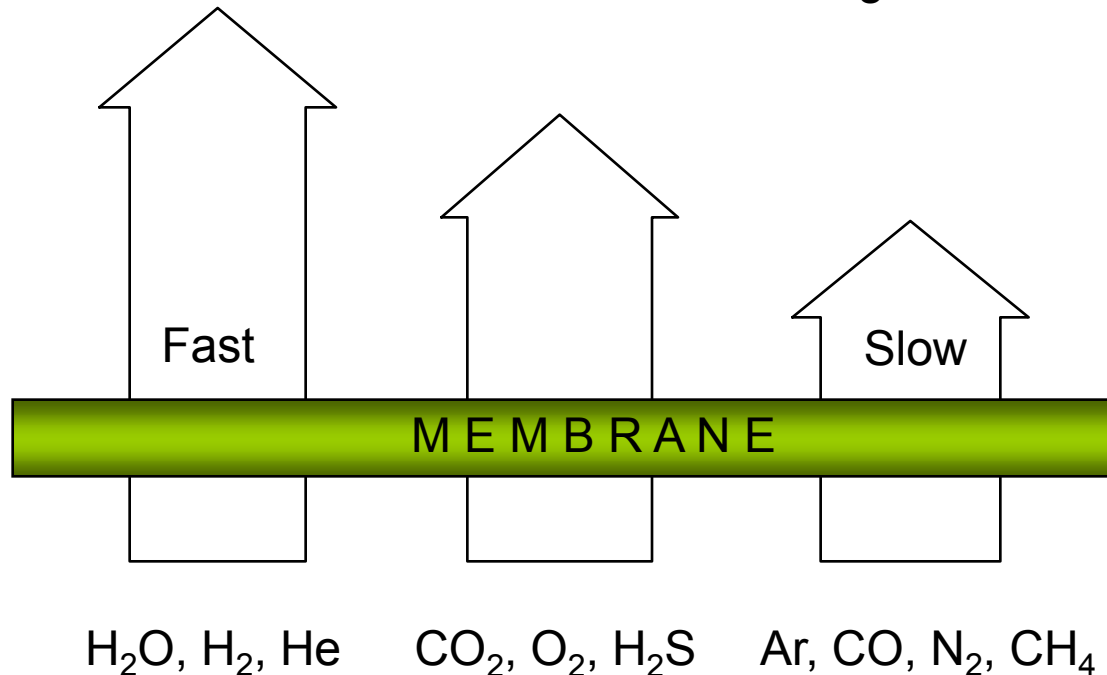
Permeability of CO₂ Removal Membranes

Fast Gases

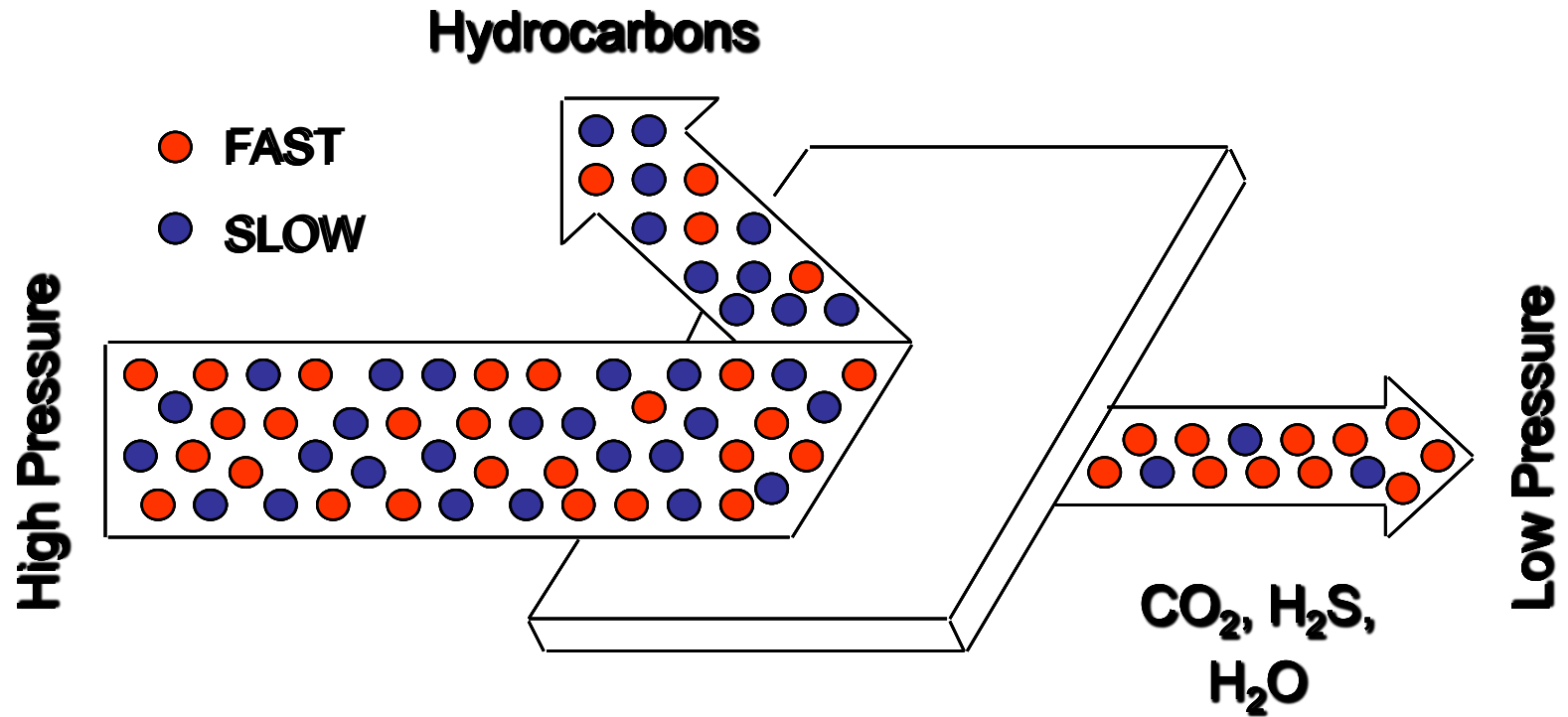
- Soluble in membrane
- Small size

Slow Gases

- Insoluble in membrane
- Large size



Membranes



Membranes

- Sensitive to solid particles
- Sensitive to Liquids
 - Requiring feed treatment
 - Removal of hydrocarbons
 - Removal of water
 - Ensuring pressure and temperature are right

Spiral Wound Membrane Element



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Membrane Skid

