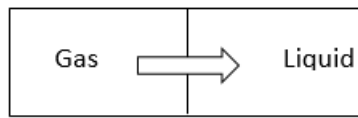


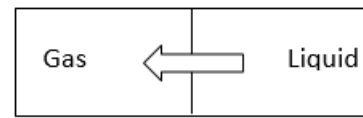
# Gas absorption

Introduction:



Preferential dissolution of one or more components in liquid.

Absorption



Preferential mass transfer from liquid to gas

Desorption (stripping)

## GAS LIQUID OPERATIONS

### Features of Gas Liquid Operations

- Two carrier streams and at least one solute
- Matter is transferred across an interface
- Carrier phases are insoluble in each other
- Liquid carrier is non-volatile
- These operations are used for solute recovery or removal
- Rate of solute transfer is proportional to departure from equilibrium

### Choice of Solvents for absorption

#### The choice depends on the operation

- Production of a specific solution (HCl acid) → Solvent is specified by Nature of production
- Removal of a certain constituent → choice is often possible (water is cheapest and most available)

#### 1. Gas solubility: -

- High solubility is required → increased rate of absorption.
- Good solubility is obtained if solute and solvent have similar chemical nature.
- In terms of mass fractions, the solubility is greater for low molecular weight solvents. Therefore, less solvent is required. (In terms of mole fraction solubility is independent).
- Chemical reaction of solvent with solute will result in very high solubility. Process must be reversible if solvent is to be reused.

H<sub>2</sub>S is readily absorbed in ethanolamine at low temperatures and stripped at high temperatures.

#### 2. Volatility

Solvent should have low vapor pressure at operating temperature in order to minimize losses of solvent. If necessary, a second less volatile liquid can be used to recover the evaporated amounts of the first.

**3. Corrosiveness:**

Material of construction for the equipment should not be expensive.

**4. Cost**

Solvent should be inexpensive → losses are not costly

**5. Viscosity:**

Low viscosity

- Rapid absorption rate
- Improved flooding conditions (higher throughput)
- Low cost of pumping
- Good heat transfer

**6. Other Factors:**

Solvent should be:

- Non-toxic
- Non-flammable
- Chemically stable
- Have low freezing point