Lecture 22: Distillation

- Distillation is a technique to separate components of a mixture based on the difference in their relative volatility. That is, separate more volatile components from less volatile components on the application of heat.
- Unlike absorption, no foreign component is added in distillation. A second vapor phase is generated on application of heat.

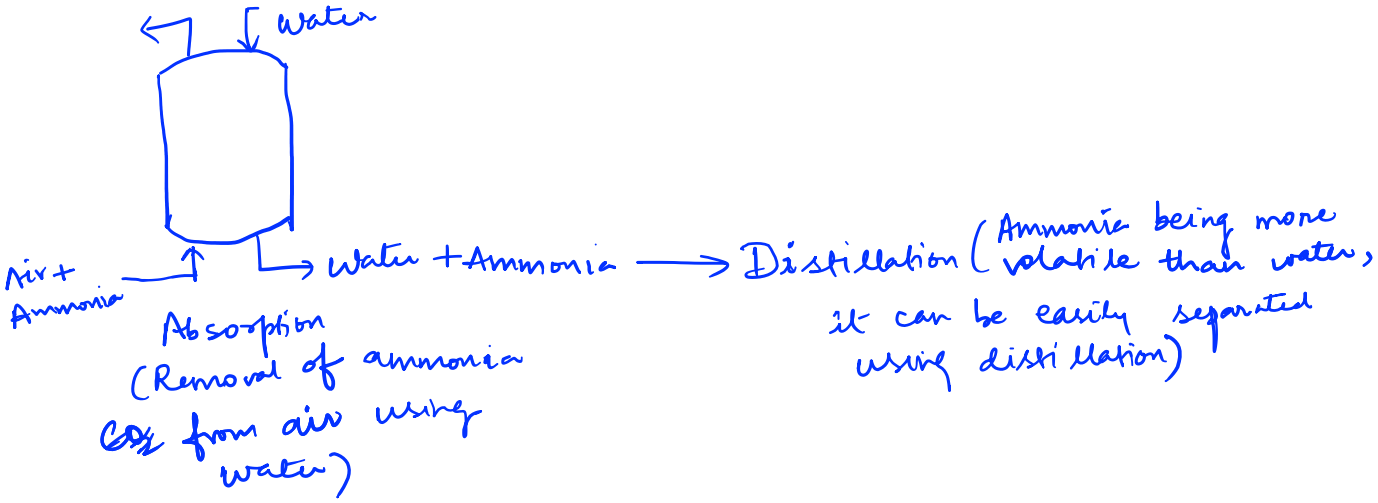
The vapor phase is rich in the more volatile component.

Component A is more volatile.

$y_A > x_A$

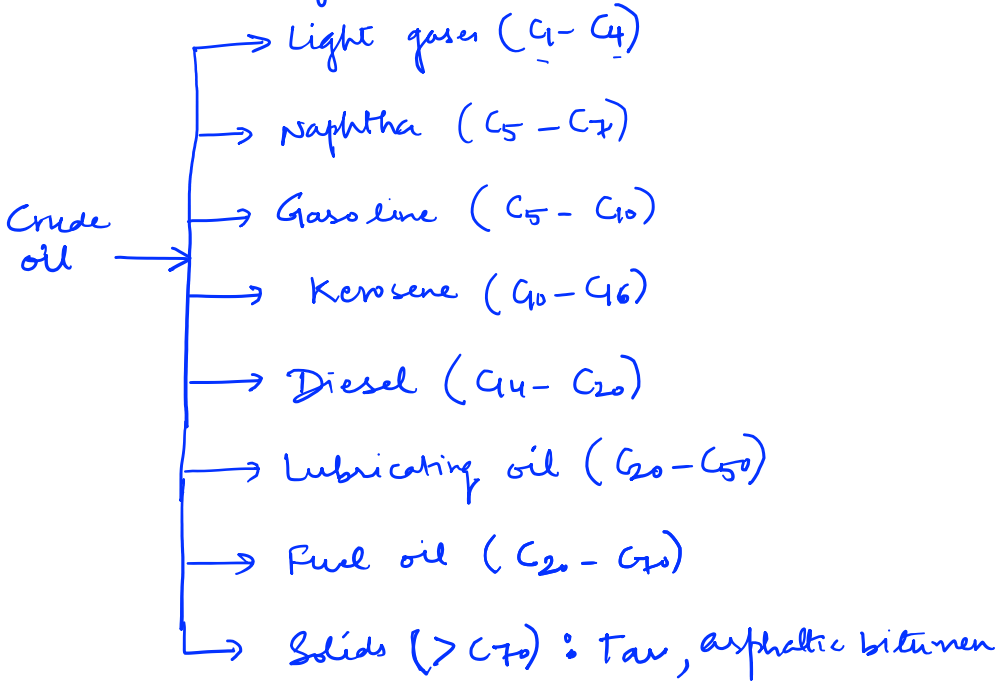
To achieve further (higher) separation, multiple contact between vapor & liquid phase is carried out in a tray tower or packed bed (tower) such that the concentration of the more volatile components will be enhanced in the vapor phase (more of the less volatile component in the liquid phase).

- One of the most important unit operation. However it is energy intensive. Very high purity products can be obtained from distillation.
- Used by itself or in combination with another unit operation.

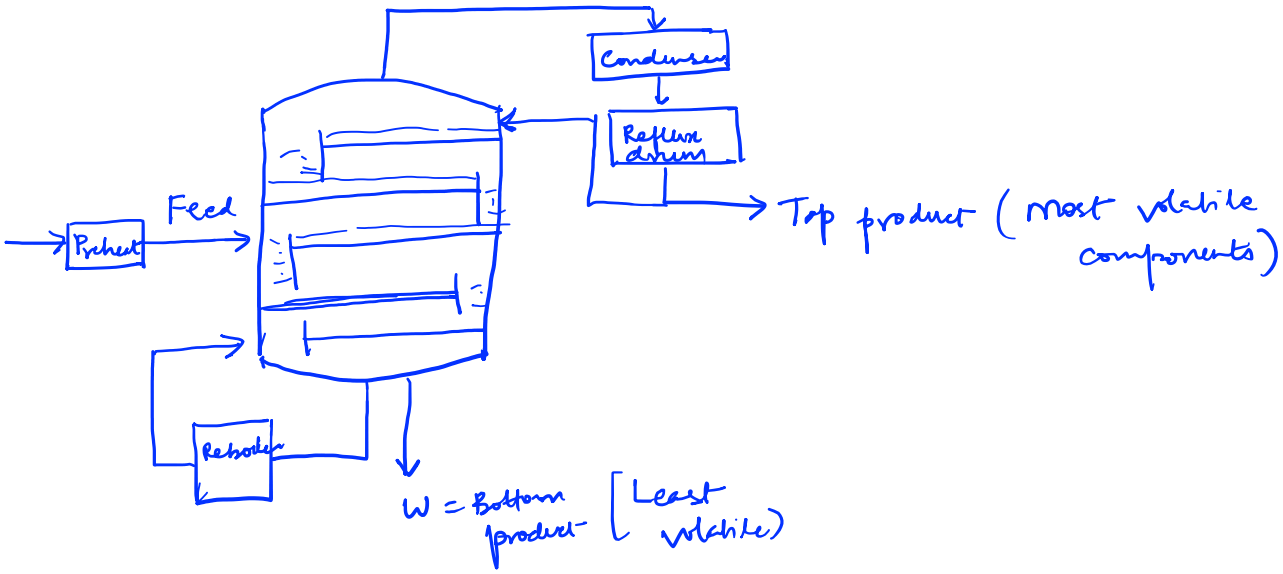


An important application of distillation?

– Fractionation of crude oil



Schematics of a distillation unit:



Difference between distillation & evaporation

- Say you would like to remove water from salt solution..
- In distillation, all components have some degree of volatility