

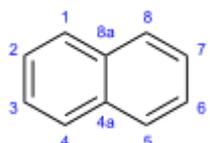
Sublimation

The purpose

The purification of solid substances and separation of volatile solid from mixture

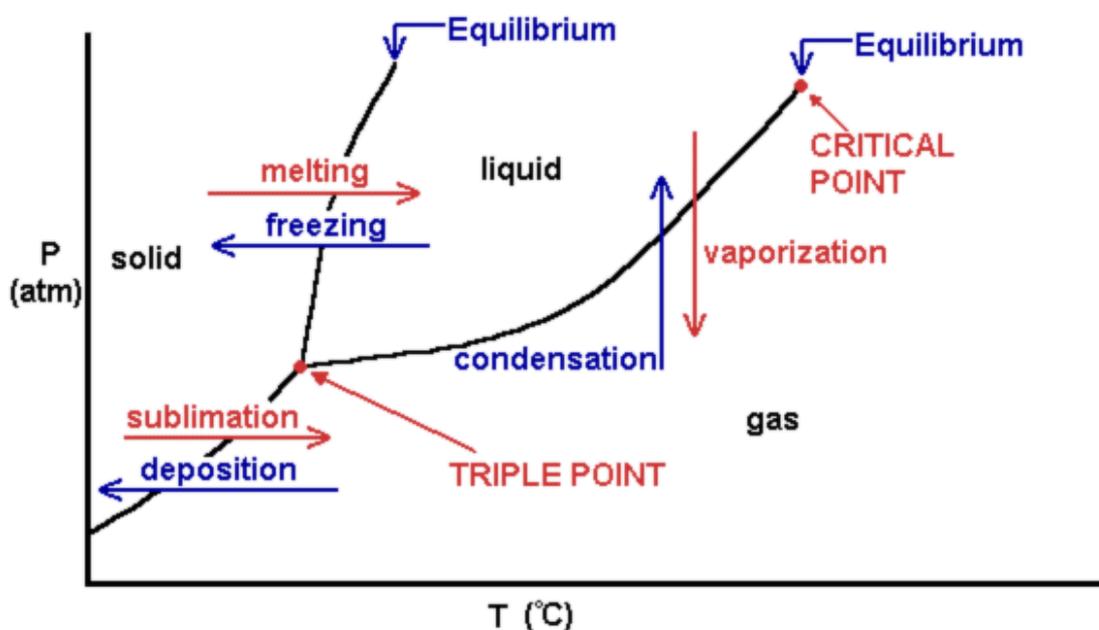
Theory:

Sublimation is defined as a direct change of state from solid to gas without going through the liquid state. The use of sublimation as a purification technique requires condensation from the gas phase to recover the solid. You can separate the sublimating substance (Naphthalene / Anthracene / Camphor / Ammonium chloride) from the mixture through the process of sublimation.



Naphthalene $p = 370 \text{ mmHg}$, $T = 179 \text{ C}$

Sublimation occurs only when a substance is at a temperature and pressure below the “triple point.” The triple point of a substance is the temperature and pressure at which the three states of matter are in equilibrium with one another .Fig



Deposition

- The opposite of sublimation is a process known as “deposition.” Deposition refers to the process of a gas transition into a solid phase without the intervening liquid phase.

An example of deposition in nature is the transformation of **water vapor** directly into **ice or snow** .

Procedure:

- 1-Place 50 mg of an unknown into a beaker
- 2-Close the beaker by watch glass , and then place ice water above the watch glass
- 3-Cautiously warm the flask until sublimation starts, and then maintain that temperature throughout the sublimation.(heating should be quite)
- 4- the solid volatilizes and condenses as a purified compound on a cooled surface leaving a non-volatile residue of impurities behind.
- 5-Once sublimation is complete, remove the ice water from the and replace it with water at room temperature.
- 6-Then collect the product, determine its weight and the percent recovery.



Observations:

The conditions of sublimation To answer this question, you would need a phase diagram for the substance the pressure needs to be lower than the pressure of the triple point, the substance must be present in its solid state, and the temperature must rise high enough to produce a gas.

Questions:

- 1- Give the reason for putting a piece of ice on the watch glass?
- 2- Which kind of substance that would purified in this methodology?
- 3- What are the triple point conditions?