

LIQUID STATE

For
B.Sc Chemistry(Part-II)
Physical Chemistry
Paper-III
Lecture-03

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Liquid State

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Liquid state

Properties:

- It does not have a definite shape and takes the shape of the container, unlike that of the solid state.
- Molecules are pretty close to each other.
- Liquids have fixed volume but no fixed shape.
- The molecules have translational motions in liquid state as those in a gas state.

Liquids are almost incompressible.

- Liquids flow from higher to lower level.
- Liquids have their boiling points above room temperature, under normal conditions.

Critical temperature of a liquid

- The critical temperature of a substance is the temperature at and above which vapor of the substance cannot be liquefied, no matter how much pressure is applied.
- Every substance has a critical temperature.

The critical temperature and critical pressure

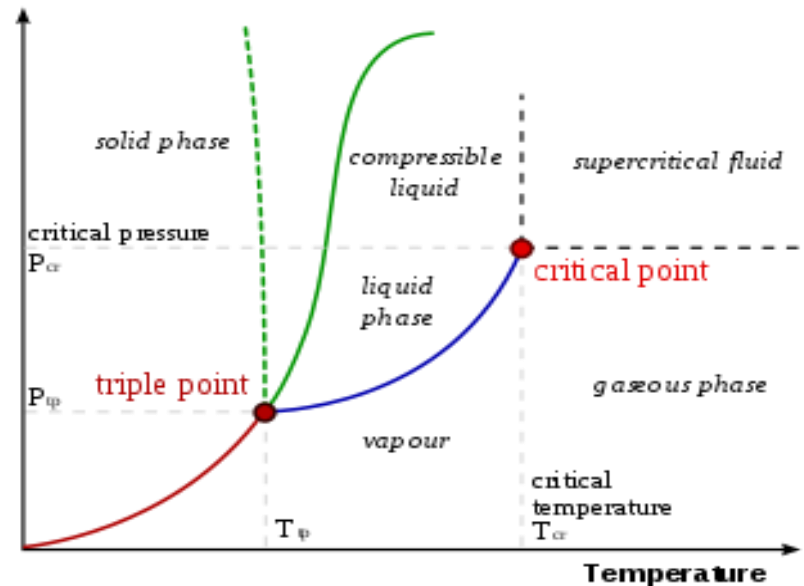
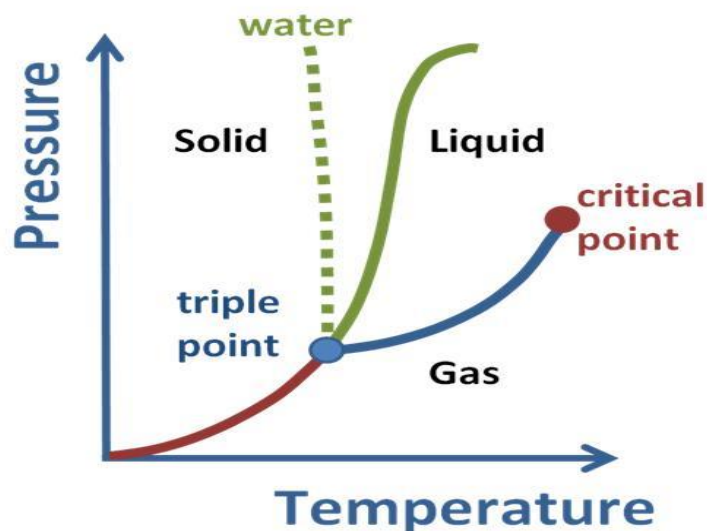
It is a critical point, beyond which the substance forms a supercritical fluid.

A substance cannot form a liquid above its critical temperature, regardless of the applied pressure.

Ionic liquids are ionic substances that are liquids at room temperature.

At what temperature and pressure is CO₂ a liquid?

- CO₂ is gaseous at atmospheric pressure.
At temperatures between -56.6 and $+31.1^{\circ}\text{C}$, and pressures of at least 5.2 bar, CO₂ can exist in liquid form.
- Liquid CO₂ cannot exist at atmospheric pressure (1 bar).
- CO₂ can occur in the solid state at temperatures below -56.6°C .



Physical properties of a liquid

- The most physical properties of a liquid are its retention of volume and its conformation to the shape of its container.
- When a liquid substance is poured into a vessel, it takes the shape of the vessel, and, as long as the substance stays in the liquid state, it will remain inside the vessel.
- It does not have a definite shape and takes the shape of the container when a liquid substance is poured into a vessel
- Liquids have fluidity and not rigidity.
- Kinetic energy of the particles in the liquid state is more than in the solid state
- Particles in the liquid state can easily diffuse.