

Specific Latent Heat

► **Definition:**

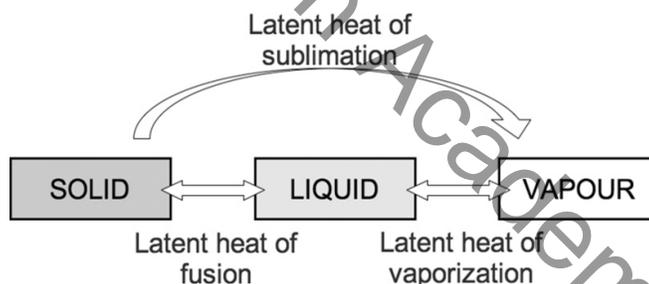
The specific latent heat of a substance is the amount of energy needed to change the state of 1 kg of the substance without changing its temperature.

► Changing the internal energy of a material will cause it to change temperature or change state. The thermal energy to:

- change the temperature is given by the specific heat capacity
- change the physical state is given by the specific latent heat

► **Each substance has two specific latent heats:**

- **Specific latent heat of fusion** (the amount of energy needed to freeze or melt the substance at its melting point)
- **Specific latent heat of vaporisation** (the amount of energy needed to evaporate or condense the substance at its boiling point)



- It usually takes more energy to boil a substance than to melt it, so the latent heat of vaporisation for a substance is usually greater than its latent heat of fusion.
- Adding heat to water can either rise the temperature or change of state. The heat that changes the state is called latent heat

Graphically representation - A change of state requires Energy

1- Heating Curve Graph

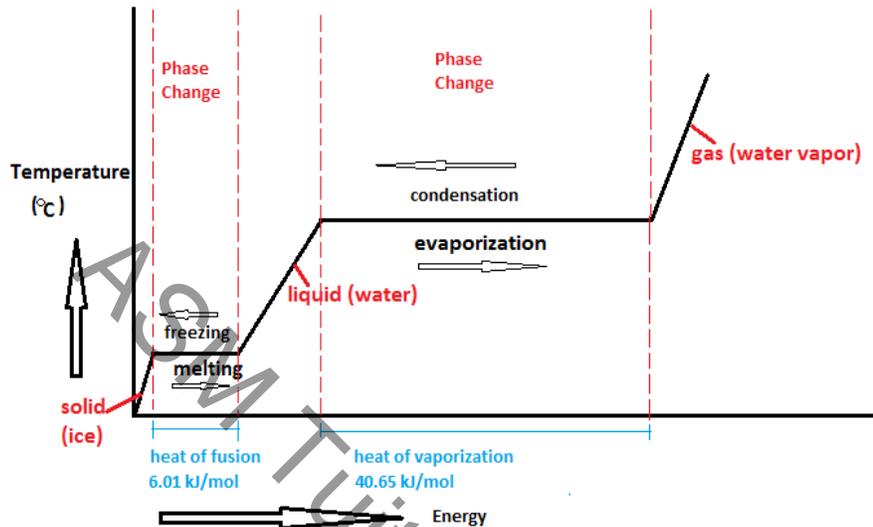
P5: Practical

Model of matter

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a) When a substance is melting or boiling, their internal energy increase, that energy is used to break the bonds between particles.

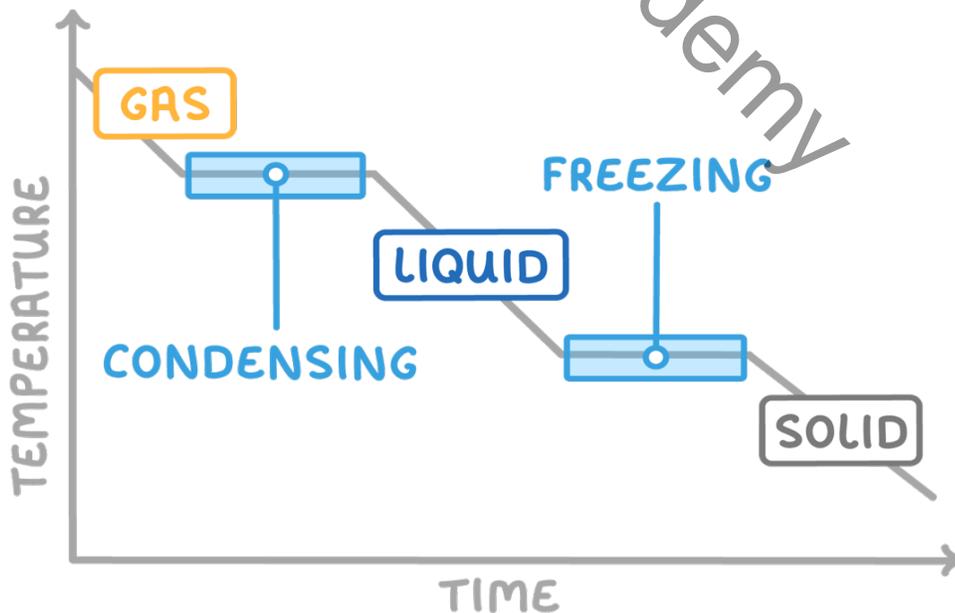
b) Flat line shows the energy is being transferred from one state to another.



2- Cooling Curve Graph:

a) When a substance is condensing or freezing bonds are formed between particles, So energy is released and internal energy is decrease.

b) Flat part shows the transferred energy from one state to another



Formula for Specific Latent heat

energy for a change of state = mass \times specific latent heat

$$E = mL$$

Where:

- **energy**, E, in joules, **J**
- **mass**, m, in kilograms, **kg**
- **specific latent heat**, L, in joules per kilogram, **J/kg**