1. Changes of State

- When ice at its melting point of 0°C gains heat energy, it changes into water at 0°C.
- When the process is reversed, water at its freezing point of 0°C loses energy, it changes into ice at 0°C.

In all changes of state, energy is released or absorbed but there is no change in temperature.

2. Specific Latent Heat

Watch this video:
https://www.bbc.com/bitesize/guides/zg6bdxs/video

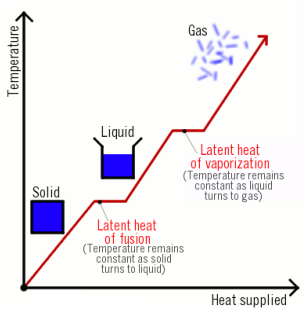
The specific latent heat (l) of a substance is the energy involved in changing the state of 1kg of substance without any temperature change.

$$E_h = ml$$

Specific latent heat (l) is measured in Jkg^{-1}.

Each substance has two specific latent heats:

1. latent heat of **fusion** (the amount of energy needed to solidify or melt the substance at its melting point)
2. latent heat of **vaporisation** (the amount of energy needed to evaporate or condense the substance at its boiling point)

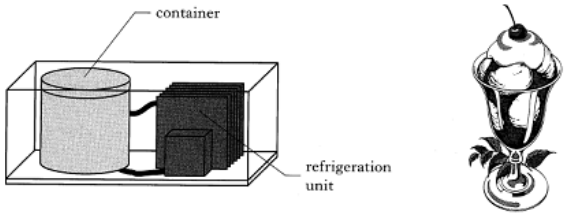


8. SPECIFIC LATENT HEAT

Homework

2005 Int2

An ice cream maker has a refrigeration unit which can remove heat at 120 Js^{-1}. Liquid ice cream, of mass 0.6kg at a temperature of 20 °C, is added to the container.



(a) Calculate how much energy must be removed from the mixture to cool it to its freezing point of -16°C.
(Specific heat capacity of ice cream = 2100 $J\,kg^{-1}\,°C^{-1}$) 3

(b) Calculate how much heat energy must be removed to freeze the ice cream at this temperature.
(Specific latent heat of fusion of ice cream = 2.34×10^5 $J\,kg^{-1}$) 3

(c) (i) Calculate the time taken to cool and freeze the ice cream. 4

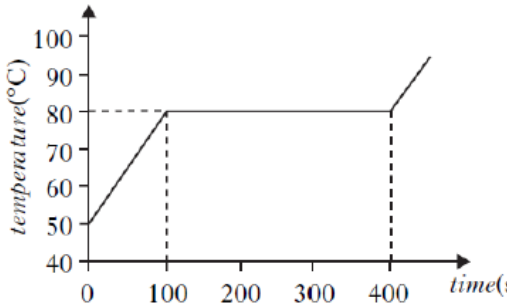
(ii) What assumption have you made in carrying out this calculation? 1

N5 Past Papers HW

2018 – MC Q16 + above Q

Example

100 g of a solid is heated by a 50W heater. The graph of temperature of the substance against time is shown.



Calculate the specific latent heat of fusion of the substance.

Fusion – solid→ liquid

$$E = ml$$

We need to calculate energy first.

$$E = Pt$$

$$E = 50 \times 300 = 1.5x10^4 J$$

$$E = ml$$

$$5 \times 10^5 = 0.1 \times l$$

$$l = 1.5 \times 10^5 Jkg^{-1}.$$