

4.1 Kinetic theory and latent heat

Name: _____ Class: _____ Date: _____

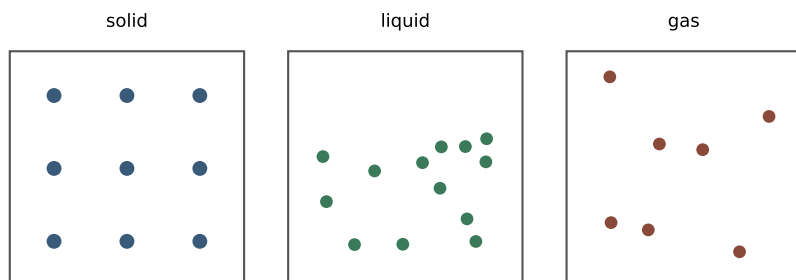
Total: 17 marks

Objective

Cover kinetic theory and changes of state (3.4.1): particle diagrams, $E = mc\Delta\theta$, (P) latent heats of vaporisation and fusion, impurities and the stearic-acid cooling-curve practical. Original OxfordAQA practice.

1 Key knowledge and worked examples

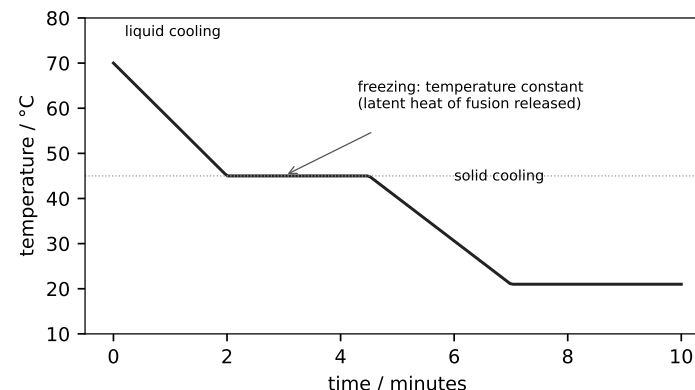
■ The model and its energies



$$E = mc\Delta\theta \quad (P) \quad E = mL_V \quad (P) \quad E = mL_F$$

Worked check. Boiling away 0.2 kg of water ($L_V = 2\,260\,000 \text{ J/kg}$): $E = 0.2 \times 2.26 \times 10^6 = 452\,000 \text{ J}$.

■ (P) The cooling curve's flat shelf



2 Practice

2.1 Describe the particle arrangement and motion in a gas. [2]

2.2 Define specific heat capacity. [1]

2.3 Calculate the energy to heat 0.8 kg of copper ($c = 390$) by 60°C . [2]

2.4 (P) State what happens to temperature during boiling. [1]

2.5 (P) Calculate the energy to melt 1.2 kg of ice ($L_F = 334\,000 \text{ J/kg}$). [2]

3 Exam-style questions

3.1 A 2.5 kg block of a mystery material absorbs 45 000 J and warms by 20 °C. Calculate its specific heat capacity. [3]

3.2 (P) Sketch or describe the temperature–time graph for stearic acid cooling from 80 °C to room temperature, labelling the plateau. [3]

3.3 (P) Explain, in particle terms, why burns from steam at 100 °C are worse than burns from water at 100 °C. [3]
