

Exercise walk-through

6.5

Energy of Phase Changes

AP Chemistry

Energy of phase changes

A **phase change** overcomes **intermolecular forces**, not bonds.

On a **heating curve**, temperature stays **constant** during a phase change – energy goes into breaking IMFs.

Heat of vaporization > **heat of fusion** (boiling separates molecules fully).



Phase changes absorb or release latent heat

Exercises 2.1-2.3

2.1 During melting, what happens to the temperature?

[1]

2.2 Write the equation for the heat to melt n moles of a solid.

[1]

2.3 Which needs more energy per mole: melting or boiling (same substance)?

[1]

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2.1 During melting, what happens to the temperature? [1]

2.1

- It stays constant
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2.2 Write the equation for the heat to melt n moles of a solid. [1]

2.2

- $q = n \Delta H_{\text{fus}}$
-

2.3 Which needs more energy per mole: melting or boiling (same substance)? [1]

2.3

- Boiling

Exercise 3.1

3.1 During a phase change, added energy goes into

[1]

☐

A raising the temperature

B overcoming intermolecular forces

C breaking covalent bonds

D speeding up the particles

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3.1 B

- overcoming intermolecular forces

Exercise 3.2 (a)

3.2 2.0 mol of ice melts. $\Delta H_{\text{fus}} = 6.0 \text{ kJ/mol}$.

(a) Find the heat needed.

[2]

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(a)

- $q = (2.0)(6.0) = 12 \text{ kJ}$

Exercise 3.2 (b)

3.2 2.0 mol of ice melts. $\Delta H_{\text{fus}} = 6.0 \text{ kJ/mol}$.

(b) State what happens to the temperature during melting.

[1]

Exercise 3.2 (b)

3.2 2.0 mol of ice melts. $\Delta H_{\text{fus}} = 6.0 \text{ kJ/mol}$.

(b) State what happens to the temperature during melting.

[1]

(b)

- The temperature stays constant (at the melting point)

Exercise 3.3

3.3 Explain why the boiling plateau on a heating curve is longer than the melting plateau for the same substance and heating rate. [2]

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3.3

- Boiling requires more energy ($\Delta H_{\text{vap}} > \Delta H_{\text{fus}}$) because it fully separates the particles, so at the same heating rate it takes longer, giving a longer plateau