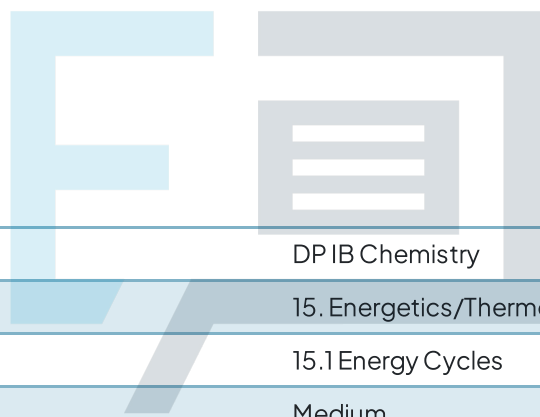




15.1 Energy Cycles

Question Paper



Course	DP IB Chemistry
Section	15. Energetics/Thermochemistry (HL only)
Topic	15.1 Energy Cycles
Difficulty	Medium

Exam Papers Practice

To be used by all students preparing for DP IB Chemistry HL
Students of other boards may also find this useful

Question 1

Thermodynamic data for the components for magnesium oxide are

Name of enthalpy change	Energy change (kJ mol ⁻¹)
Enthalpy of formation of magnesium oxide	-602
Enthalpy of atomisation of magnesium	150
First and second ionisation energy of magnesium	2188
Enthalpy of atomisation of oxygen	248
First and second electron affinity of oxygen	702

Which of the following is used to calculate the lattice enthalpy of magnesium oxide

- A. $-602 - 150 - 2188 - 248 + 702$
- B. $-602 - 150 - 2188 - 248 - 702$
- C. $-602 - 150 - 2188 - \frac{248}{2} - 702$
- D. $-602 - 150 - 2188 - (2 \times 248) - 702$

[1 mark]

Question 2

Using the information in the table to answer the question

Enthalpy Change	Value (kJ mol ⁻¹)
$\Delta H_{\text{latt}}^{\ominus} \text{CaF}_2$	2651
$\Delta H_{\text{hyd}}^{\ominus} \text{Ca}^{2+}$	-1616
$\Delta H_{\text{hyd}}^{\ominus} \text{F}^-$	-504

Which of the following is the correct value for the enthalpy change of solution, $\Delta H_{\text{sol}}^{\ominus}$, of calcium fluoride, CaF₂?

- A. $+2651 + [(-1616) + (-504)]$
- B. $+2651 - [(-1616) + (-504)]$
- C. $+2651 + [(-1616) + (-1008)]$
- D. $+2651 - [(-1616) + (-1008)]$

[1 mark]

Question 3

Which of the following ionic compounds has the greatest lattice enthalpy?

- A. Potassium chloride
- B. Calcium bromide
- C. Beryllium oxide
- D. Silver bromide

[1 mark]

Question 4

Which of the following changes is **not** endothermic?

- A. $K(g) \rightarrow K^+(g) + e^-$
- B. $Cl(g) + e^- \rightarrow Cl^-(g)$
- C. $Ca(s) \rightarrow Ca(g)$
- D. $O^-(g) + e^- \rightarrow O^{2-}(g)$

[1 mark]

Exam Papers Practice

Question 5

Which statements are correct for ionic compounds?

- I. Solubility in water depends on the relative magnitude of the lattice energy compared to the hydration energy
- II. Melting points of ionic compounds increase as the size of the cation increases
- III. The enthalpy of solution for calcium chloride is represented by $CaCl_2(s) \rightarrow CaCl_2(aq)$

- A. I and II only
- B. I and III only
- C. II and III only
- D. I, II and III

[1 mark]