

Exercise walk-through

6.2

Energy Diagrams

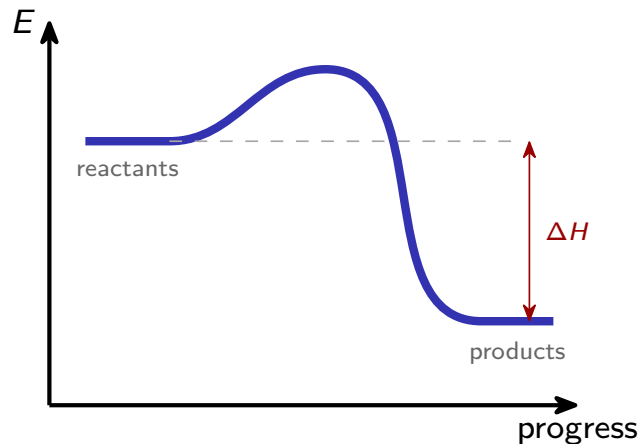
AP Chemistry

Energy diagrams and enthalpy

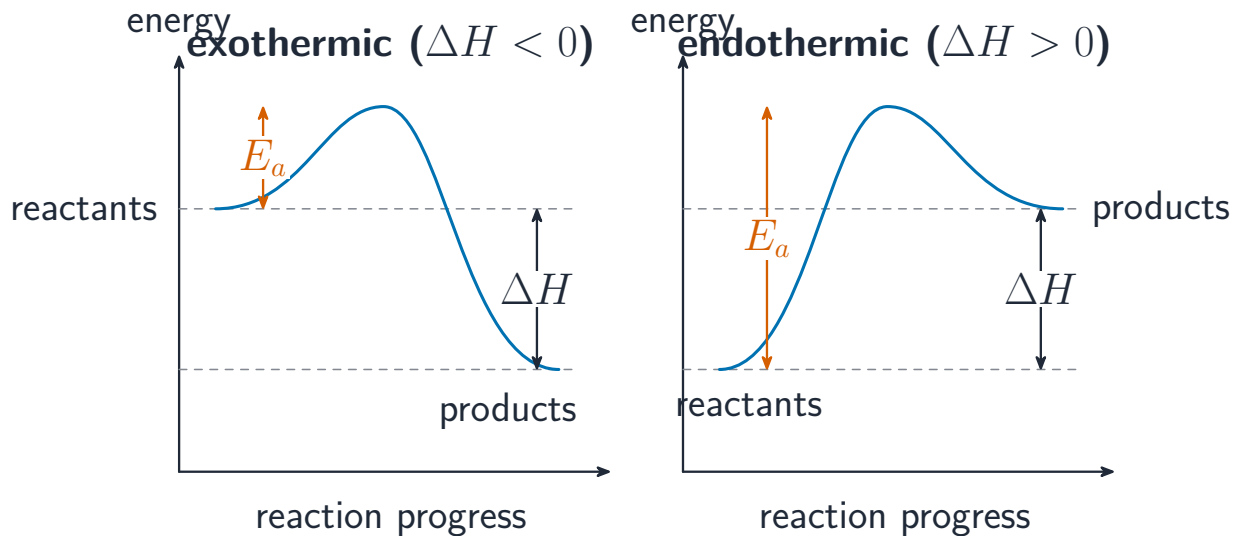
The **enthalpy change** ΔH is the heat at constant pressure:

- products **lower** $\Rightarrow \Delta H < 0$
(exothermic)
- products **higher** $\Rightarrow \Delta H > 0$
(endothermic)

ΔH is **extensive** – double the moles, double ΔH .



Energy Diagrams



Energy diagrams: exothermic products sit below the reactants, endothermic above

Exercises 2.1-2.3

2.1 On an energy diagram, how is ΔH found? [1]

2.2 For an exothermic reaction, are the products higher or lower than the reactants? [1]

2.3 Where is E_a measured to on the diagram? [1]

Exercises 2.1-2.3

2.1 On an energy diagram, how is ΔH found? [1]

2.1

- Products' energy minus reactants' energy
-

2.2 For an exothermic reaction, are the products higher or lower than the reactants? [1]

2.2

- Lower
-

2.3 Where is E_a measured to on the diagram? [1]

2.3

- From the reactants up to the peak

Exercise 3.1

3.1 On an **endothermic** energy diagram, the products are

[1]

☐

A lower than the reactants

B higher than the reactants

C at the same level

D at the peak

Exercise 3.1

3.1 On an **endothermic** energy diagram, the products are

[1]

☐

A lower than the reactants

B higher than the reactants

C at the same level

D at the peak

3.1 B

- higher than the reactants

Exercise 3.2 (a)

3.2 An energy diagram shows reactants at 30 kJ, peak at 110 kJ, products at 70 kJ.

(a) Find E_a .

[1]

Exercise 3.2 (a)

3.2 An energy diagram shows reactants at 30 kJ, peak at 110 kJ, products at 70 kJ.

(a) Find E_a . [1]

(a)

- $E_a = 110 - 30 = 80 \text{ kJ}$

Exercise 3.2 (b)

3.2 An energy diagram shows reactants at 30 kJ, peak at 110 kJ, products at 70 kJ.

(b) Find ΔH and classify the reaction.

[2]

Exercise 3.2 (b)

3.2 An energy diagram shows reactants at 30 kJ, peak at 110 kJ, products at 70 kJ.

(b) Find ΔH and classify the reaction.

[2]

(b)

- $\Delta H = 70 - 30 = +40$ kJ, endothermic

Exercise 3.3

3.3 Two reactions have the same ΔH but different E_a . Explain which reacts faster and why. [2]

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3.3

- The one with the **lower** E_a reacts faster, because a larger fraction of collisions exceed the smaller barrier