CIE Chemistry IGCSE

Topic 6 - Chemical Energetics

Flashcards

What do the terms exothermic and endothermic mean?

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Endothermic - a reaction that takes in heat energy from the surroundings.

Exothermic - a reaction that gives out energy to the surroundings.

Give an example of a type of reaction that is exothermic

Give an example of a type of reaction that is exothermic

Combustion

Neutralisation

Give an example of an endothermic reaction

Give an example of an endothermic reaction

Thermal decomposition

Photosynthesis

In terms of bond energies, what happens during a chemical reaction? Describe exothermic and endothermic reactions in terms of bonds breaking / making (extended only)

In terms of bond energies, what happens during a chemical reaction? Describe exothermic and endothermic reactions in terms of bonds breaking / making (extended only).

Energy is needed to break bonds and is released when bonds are made.

Exothermic: Energy released from making bonds is greater than the energy used to break bonds.

Endothermic: Energy required to break bond is greater than the energy released when making bonds.

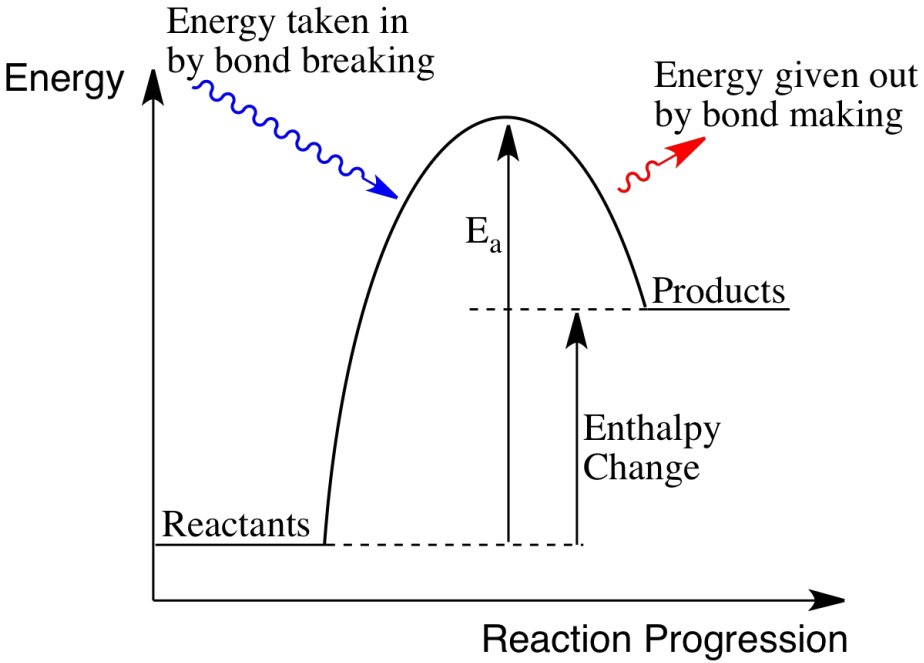
What is a reaction profile?

What is a reaction profile?

A graph which shows the relative energies of reactants and products, as well as the activation energy of the reaction.

Draw a reaction profile for an endothermic reaction (extended only)

Draw a reaction profile for an endothermic reaction (extended only)



Draw a reaction profile for an exothermic reaction

(extended only)

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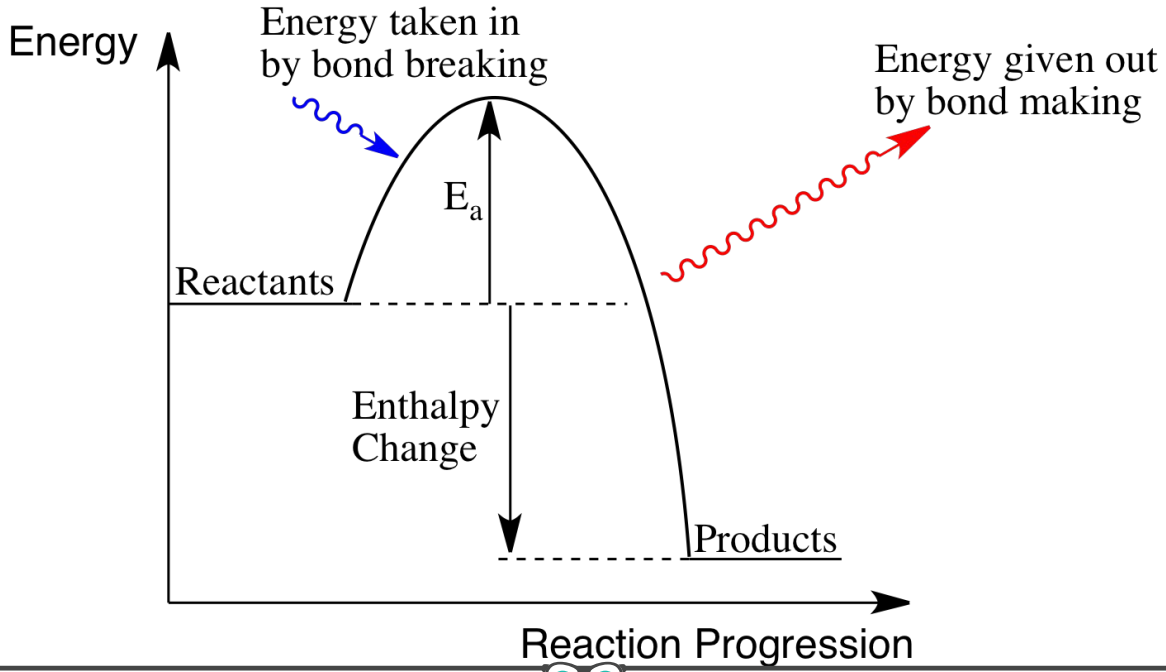
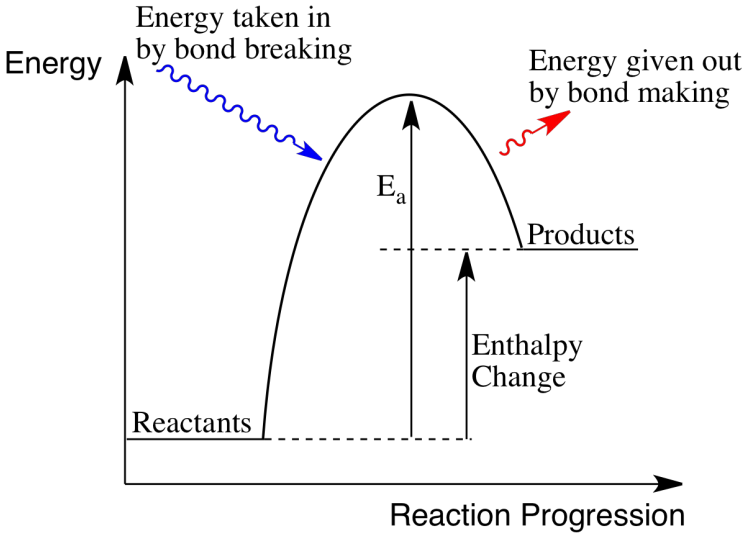
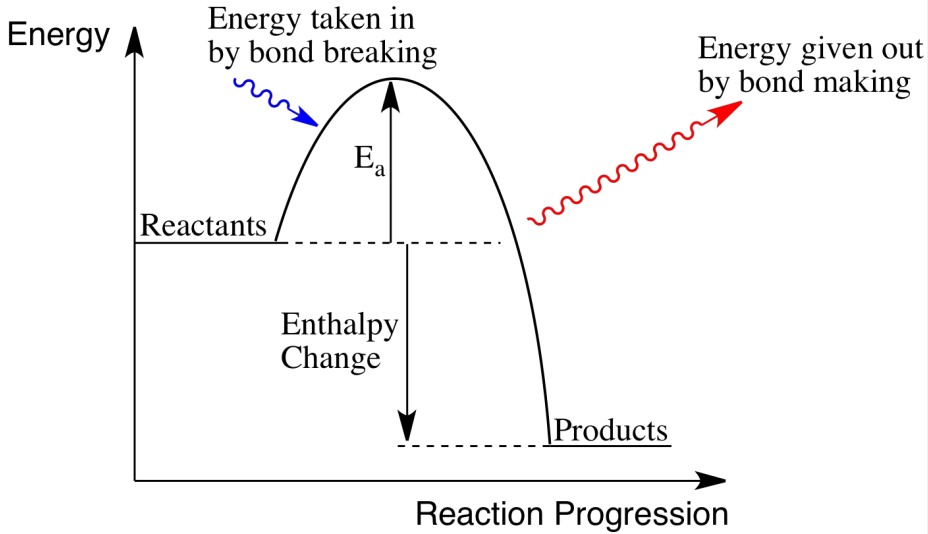


Label the following reaction profiles as exothermic or endothermic:





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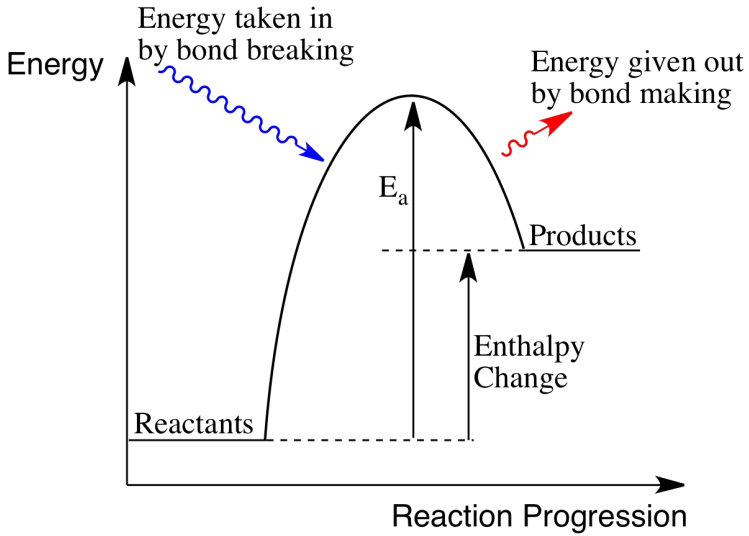
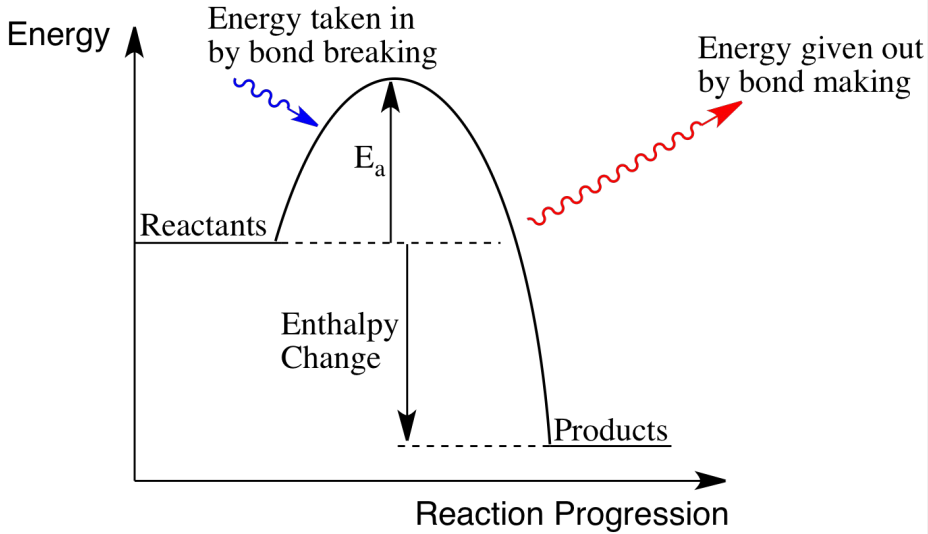


Endothermic



Exothermic

How can the energy change of a reaction be calculated from bond energies? (extended only)

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Energy change (kJ mol^{-1}) =

Total energy of bonds broken - total energy of bonds made

If the energy change of a reaction is negative, is the reaction exothermic or endothermic?

(extended only)

If the energy change of a reaction is negative, is the reaction exothermic or endothermic? (extended only)

Exothermic

Energy has been lost to the surroundings

Fill in the gap: ‘Fuels are burned to release ____ ____’

Fill in the gap: ‘Fuels are burned to release _____’

Heat energy

Which colourless gas can be used as a fuel?

Which colourless gas can be used as a fuel?

Hydrogen

What is a fuel cell?
(extended only)

What is a fuel cell? (extended only)

A cell that continually produces a voltage as long as it is supplied with oxygen and a fuel (like hydrogen).

What is the only product of a hydrogen-oxygen fuel cell?
(extended only)

What is the only product of a hydrogen-oxygen fuel cell? (extended only)

Water

Write an equation for the overall reaction that takes place in a hydrogen-oxygen fuel cell

(extended only)

Write an equation for the overall reaction that takes place in a hydrogen-oxygen fuel cell (extended only)

$$2H_2 + O_2 \rightarrow 2H_2O$$

What are the advantages of fuel cells? (extended only)

What are the advantages of fuel cells?

(extended only)

- No pollution produced
- Produce more energy than an alternative fuel like petrol
- Continuous process as long as fuel is supplied

What are the disadvantages of fuel cells?

(extended only)

What are the disadvantages of fuel cells? (extended only)

- Materials used to make them are expensive.
- High pressure tanks required to store oxygen and fuels like hydrogen.
- Hydrogen is expensive and hard to store
- Temperature affects efficiency.

Give an example of a radioactive isotope which can be used as a source of energy

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Uranium 235 (^{235}U)

What type of power stations use radioactive isotopes as sources of energy?

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Nuclear power stations