

Exothermic reaction

1. An exothermic reaction is a reaction in which heat **energy** is **given out** to the surroundings; hence the temperature of the surroundings **rises**. [4]
2. In an exothermic reaction, the **products** formed are at a **lower energy** level than that of the reactants; hence the excess energy is **given out** to the surroundings. [4]

Endothermic reaction

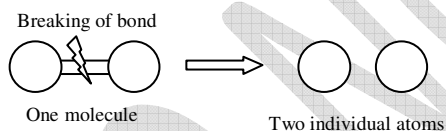
3. An endothermic reaction is a reaction in which heat **energy** is **absorbed** from the **surroundings**; hence the **temperature** of the surroundings **falls**. [5]
4. In an endothermic reaction, the products formed are at a **higher energy** level than that of the reactants; hence energy is **absorbed** by the reactants from the **surroundings**. [4]

Enthalpy change

5. The **amount of energy involved in a reaction** is known as the heat change or **enthalpy change** of the reaction. It is measured in **kilojoules** (kJ) and represented by the symbol ΔH . Δ is the Greek letter 'delta', which means change. **H** means energy content. [3]
6. For an exothermic reaction, ΔH is **negative**. This is because the chemicals have **lost energy** to the surroundings. [3]
7. For an endothermic reaction, ΔH is **positive**. This is because the chemicals **gain energy** from the surroundings. [3]

Bond breaking

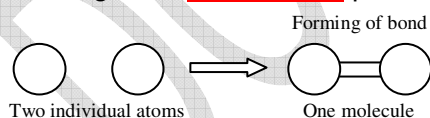
8. Before two substances can react, their molecules must **collide** with each other first. The bonds in the original molecules are then **broken** down before the atoms **recombine** to form new bonds. [3]
9. In general, energy is required to break bonds, so bond breaking is an **endothermic** process. [1]



[1]

Bond forming

10. Energy is released or given out when atoms **form** bonds because they become more **stable**, so bond forming is an **exothermic** process. [3]



11. During chemical reactions, energy is **absorbed** to **break** the bonds in the reactants. Energy is given out to **form** the new bonds in the **products**. [4]
12. The reaction is exothermic if **more energy** is **released** during bond **formation** than needed for bond breaking. [4]
13. The reaction is endothermic if **more energy** is **needed** for bond **breaking** than is released during bond formation. [4]

14. Classify the following under exothermic or endothermic reactions with a (✓)

[10]

		Exothermic	Endothermic
a	The combustion of fuels	✓	
b	Neutralisation reactions	✓	
c	Dissolving ammonium chloride in water		✓
d	Burning of magnesium in air	✓	
e	Dissolving an anhydrous salt	✓	
f	Photosynthesis		✓
g	Diluting a concentrated acid or alkali	✓	
h	Burning of petrol	✓	
i	Respiration	✓	
j	Photography		✓

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