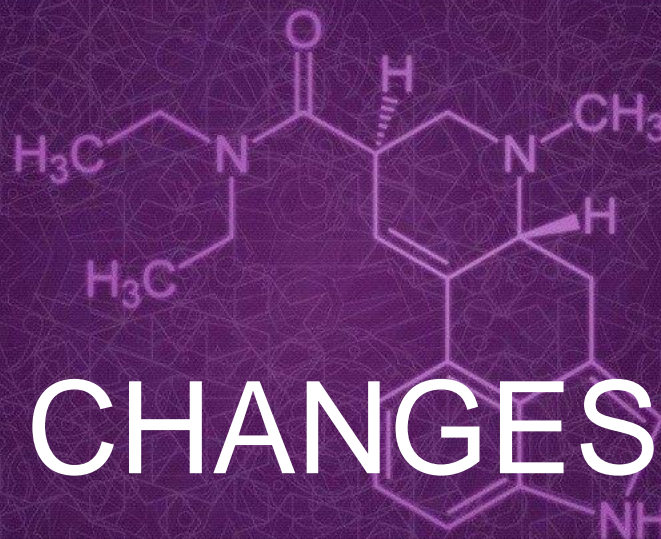


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TOPIC 4: ENERGY CHANGES



THE ABOUT

CHAPTER ANALYSIS



TIME

- Relatively straight forward chapter
- Understand 'system' & 'surroundings'



EXAM

- Learn how to calculate bond energy
- Learn how to sketch energy profile diagram



WEIGHTAGE

- Light-medium overall weightage
- Constitute to **3%** of marks for past 5 year papers

KEY CONCEPT

ENERGY FROM CHEMICALS

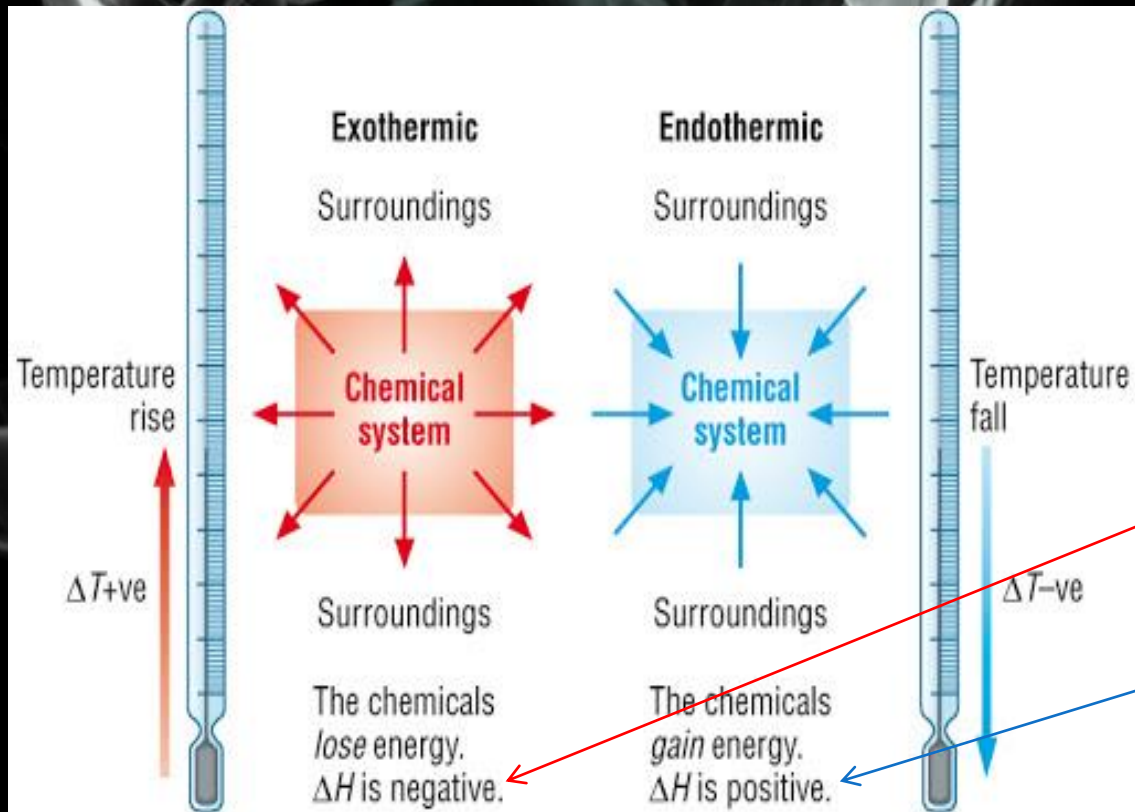
EXOTHERMIC

ENDOTHERMIC

Pay special attention to your understanding of 'system' & surrounding. It is the foundation of this chapter.



ENERGY FROM CHEMICAL REACTIONS



ENERGY FROM CHEMICAL REACTION

During chemical reactions, chemical bonds are both broken and formed.

These two processes change the overall energy in a system.

The system refers to the reactants and products while the **surrounding experiences a change in temperature** due to the system releasing heat energy or absorbing heat.

For an **exothermic reaction**, the chemical reactions result in the **system losing heat energy to the surroundings**. The overall **energy level of the system decreases**.

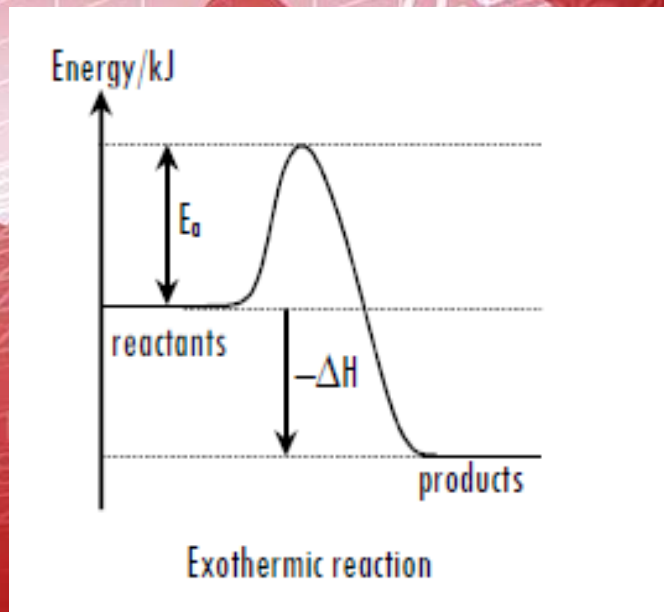
For an **endothermic reaction**, the chemical reactions result in the **system gaining heat energy from the surroundings**. The overall **energy level of the system increases**.

Tips:

"My ex-bf is very hot"

Exothermic → surrounding temperature increases (hot)

EXOTHERMIC REACTION

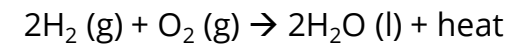


EXOTHERMIC REACTION

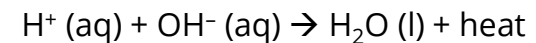
An exothermic reaction is a process in which energy is given out to the surroundings.

Condensation and freezing are exothermic changes as heat is given out to the surroundings.

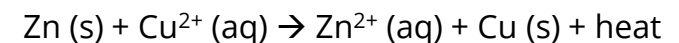
Combustion reactions are exothermic. Burning a compound (such as a hydrocarbon) in the presence of oxygen will generate heat and increase the temperature of the surroundings.



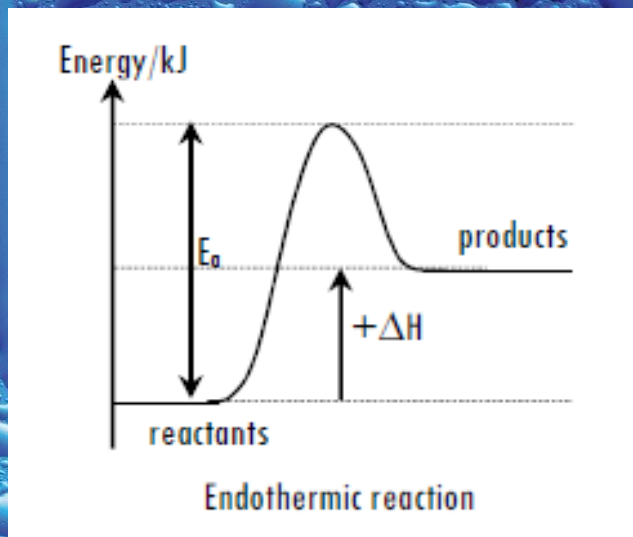
Neutralisation reactions are exothermic. Heat is given out when hydrogen ions react with hydroxide ions to form water.



Displacement of a less reactive metal in a compound by a more reactive metal gives out heat.



ENDOTHERMIC REACTION



ENDOTHERMIC REACTION

An endothermic reaction is a change in which energy is taken in from the surroundings.

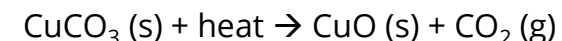
Melting and boiling are endothermic changes where heat energy is absorbed.

Dissolving ionic salts in water is endothermic. When some salts are dissolved in water, heat is absorbed. For instance, dissolving ammonium chloride or ammonium nitrate in water decreases the temperature of the solution.



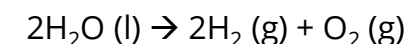
Thermal decomposition is an endothermic process as most compounds absorb heat to be decomposed.

Green copper (II) carbonate absorbs heat and decomposes into black copper (II) oxide and carbon dioxide.



Electrolysis is an endothermic reaction that does not absorb heat energy. Instead, electrolysis involves taking in electrical energy in order to drive a reaction.

In the electrolysis of water, water decomposes into oxygen and hydrogen gas due to an electric current passing through the water.



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