Enthalpy Change: Potential Energy Diagram

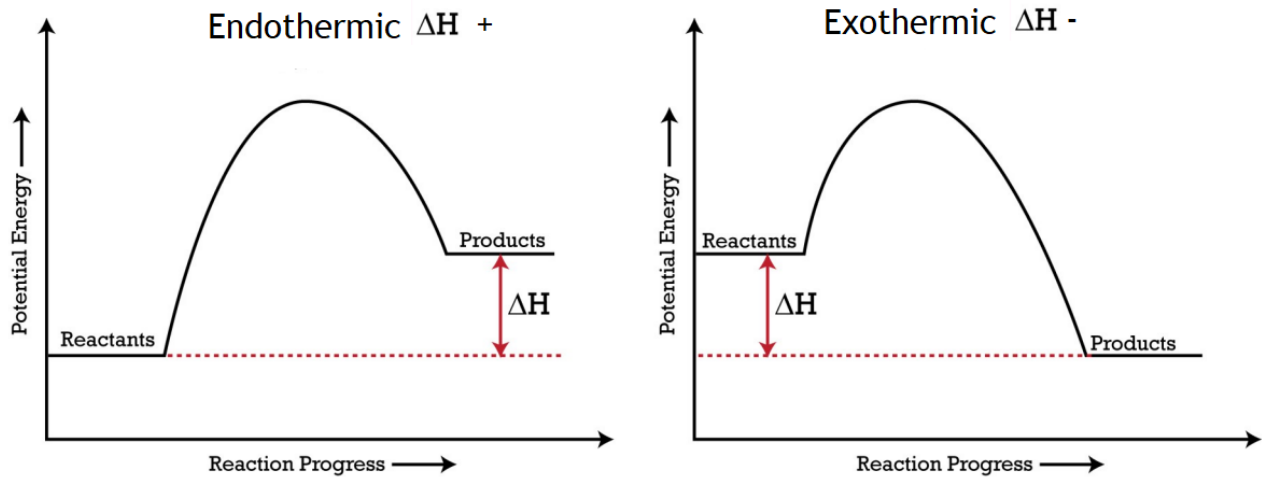
Enthalpy change (ΔH)

The energy difference between the enthalpy of the products and the reactants.

$$\Delta H = H_P - H_R$$

Potential Energy Diagrams

A potential energy diagram can be used to show the energy pathway for a reaction.



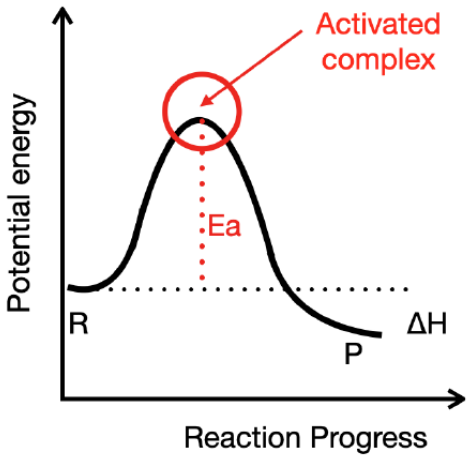
Activated complex

An unstable arrangement of atoms formed at the maximum of the potential energy barrier, during a reaction.

Activation energy (E_a)

Minimum energy required by colliding particles to form an activated complex.

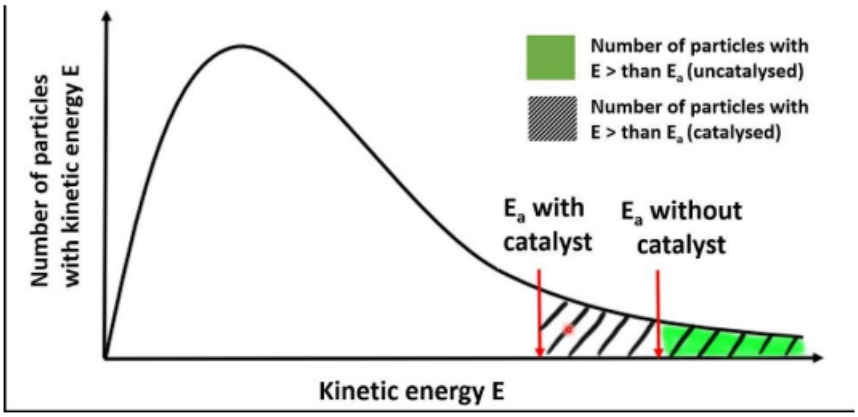
Lower activation energies require a smaller input of energy and are more likely to take place at room temperature.



Enthalpy Change: Potential Energy Diagram

Catalyst

A catalyst speeds up the rate of a reaction by lowering the activation energy. This means that more particles will have energy beyond the new activation energy so the likelihood of successful collisions increases.



Potential Energy Diagram Catalysts

A catalyst will

1. **Lower E_a** (activation energy) by providing an alternative pathway for the reaction.

2. **No effect** on ΔH (enthalpy change).