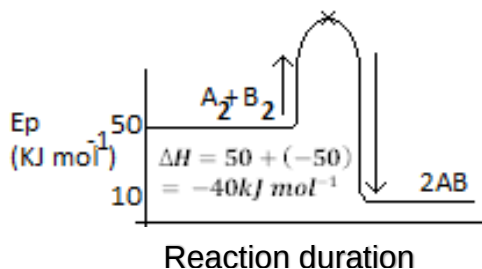


Energy

Exothermic

$E_A \rightarrow$ activated complex

- Spontaneous $\rightarrow$ no external E
- Product less E than reagents $\therefore E$ released
- $A_2 + B_2 \rightarrow 2AB + E$



$\therefore$ More E released than absorbed.

- $\Delta H = \text{product-reagent}$
- $\Delta H < 0$ $\Delta H = -\text{value}$
- Reaction that releases more energy or warmth, energy flows from the system to the environment, spontaneously. Wants to be at a lower E condition.

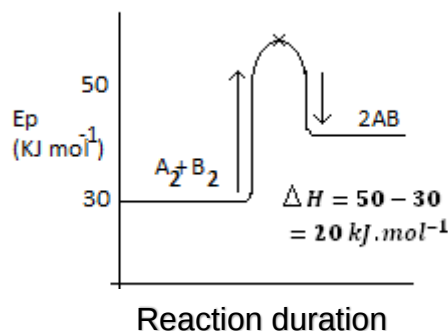
For example:

- * combustion
- * respiration
- * neutralization
- * hydration

Endothermic

$E_A \rightarrow$ activated complex

- Not spontaneous $\rightarrow$ constant addition of E needed.
- Product more energy than reagents $\therefore E$ absorbed.
- $A_2 + B_2 + E \rightarrow 2AB$



$\therefore E$ releases less than E absorbed

- $\Delta H = \text{product-reagent}$
- $\Delta H > 0$; $\Delta H = +\text{value}$
- Reaction that absorbs energy, warmth flows from environment to the system, non-spontaneously. Products at higher E_p than reagents.

For example

- * photosynthesis
- * electrolysis
- * thermic decomposition