EXOTHERMIC

An exothermic reaction occurs when the temperature of a system increases due to the evolution of heat.

Vs

ENDOTHERMIC

An endothermic reaction occurs when the temperature of an isolated system decreases while the surroundings of a non-isolated system gains heat.

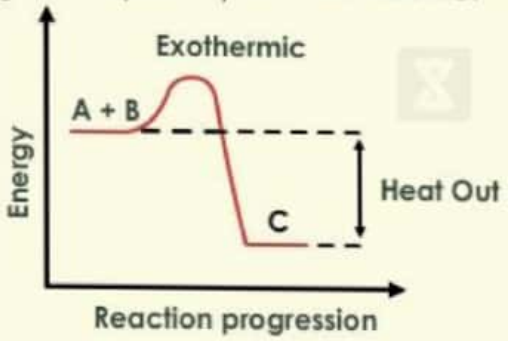
EXOTHERMIC

Heat is released into the surroundings, resulting in an overall negative quantity for the heat of reaction.

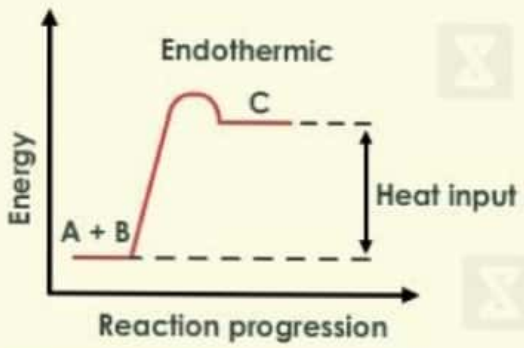
An exothermic reaction has a negative **ΔH** by convention, because the enthalpy of the products is lower than the enthalpy of the reactants of the system.

$$C(s) + O_2(g) \rightarrow CO_2(g) \qquad (\Delta H = -393.5\ kJ)$$

The enthalpies are **less than zero.**



ENDOTHERMIC



Endothermic reactions result in an overall positive heat of reaction.

An endothermic reaction has a positive **ΔH,** because the enthalpy of the products is higher than the enthalpy of the reactants of the system.

$$N_{2(g)} + O_{2(g)} \rightarrow 2NO_{(g)} \qquad (\Delta H = +180.5\ kJ)$$

EXOTHERMIC	ENDOTHERMIC
Making ice cubes	Melting ice cubes
Formation of snow in clouds	Conversion of frost to water vapour
Condensation of rain from water vapour	Evaporation of water
A candle flame	Forming a cation from an atom in the gas phase
Mixing sodium sulphite and bleach	Baking bread
Rusting iron	Cooking an egg
Burning sugar	Producing sugar by photosynthesis
Forming ion pairs	Separating ion pairs
Combining atoms to make a molecule in the gas phase	Splitting a gas molecule apart
Mixing water and strong acids	Mixing water and ammonium nitrate
Mixing water with an anhydrous salt	Making an anhydrous salt from a hydrate
Crystallizing liquid salts (as in sodium acetate in chemical handwarmers)	Melting solid salts