



Section 3B

Heat of Reaction



Energy

Energy: ability to do work or produce heat.

Types of energy

1) Potential energy - energy possessed by objects due to position or arrangement of particles.

Forms of potential energy - electrical, chemical, gravitational

2) Kinetic energy - energy of motion

3) Radiant energy - energy given off by subatomic particles (such as photons, electrons, neutrons, etc.) or chemical reactions.



Law of Conservation of Energy

Energy can not be created or destroyed, only changed into some other type of energy.

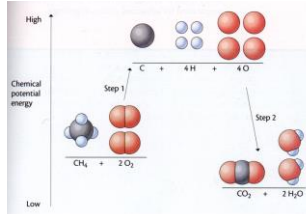
Energy conversions can start or end up in potential energy (chemical or position), kinetic energy (mechanical) or radiant energy (thermal, electrical, light, sound).

Definition

Thermochemistry is the study of the changes in heat in a chemical reaction.

Heat is measured in Joules (J)

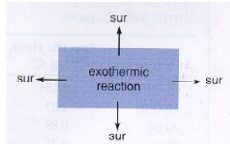
The heat of a reaction depends on the chemical energy of the reactants in comparison to the chemical energy of the products



Exothermic

An exothermic reaction is a chemical reaction that releases heat.

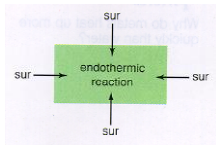
- “exo” means outside, “thermes” means heat, so this type of reaction releases heat to the outside of the reaction.



Endothermic

An endothermic reaction is a chemical reaction that absorbs heat.

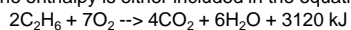
- “endo” means inside, “thermes” means heat, so this type of reaction takes heat inside the reaction.



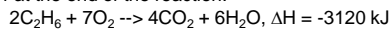
Enthalpy (Heat of Reaction)

Enthalpy is a measure of the heat (energy) absorbed and released in a reaction. The symbol for enthalpy is ΔH .

The enthalpy is either included in the equation:



Or at the end of the reaction:



A negative enthalpy means the reaction is exothermic because the reactants have lost energy.

What type of reaction would exist if the heat energy were a reactant? If the enthalpy were positive?

Stoichiometry and Heat

Knowing the enthalpy of a reaction, we can determine the heat given off or absorbed by the given mass of a reactant.

The molar coefficients are directly related to the enthalpy.
