

Success 24/7 Chemistry: Enthalpy

Enthalpy (H) - the amount of heat in a system at a given temperature

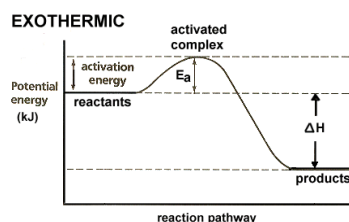
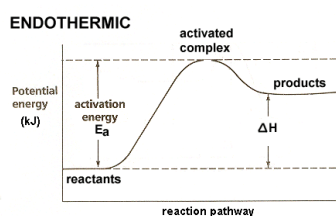
Enthalpy change: $\Delta H = q = mC\Delta T$

ΔH is also called the heat of reaction

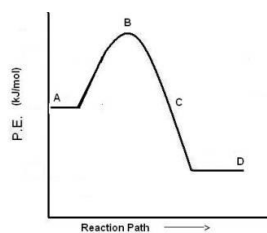
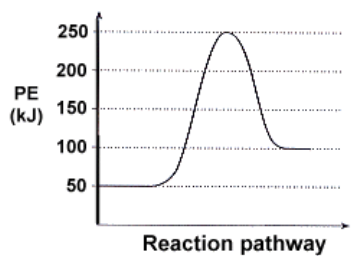
Endothermic reactions have $+\Delta H$

Exothermic reactions have $-\Delta H$

Potential Energy Diagrams

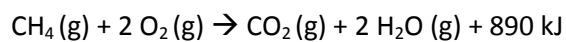


Practice: On the following potential energy diagrams, label the products, reactants and if it an exothermic or endothermic reaction.

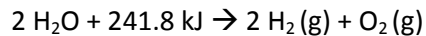


Thermochemical Equations

Thermochemical equations include heat changes. Physical states must be included.



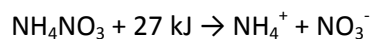
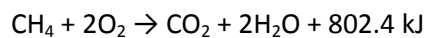
exothermic (energy is a product)



endothermic (energy is a reactant)

Practice:

Based on the following thermochemical equations, indicate whether each reaction is exothermic or endothermic.

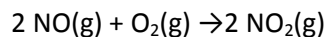


Standard Heat of Formation of a compound (ΔH_f°)

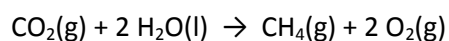
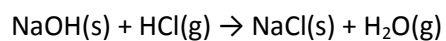
* ΔH_f° of a free element (an element not in a compound) in its standard state is zero.

*This is another way to calculate ΔH for a reaction.

$$\Delta H = \Delta H_f^\circ \text{ products} - \Delta H_f^\circ \text{ reactants}$$



Practice:



Formula	ΔH_f (kJ/mol)	Formula	ΔH_f (kJ/mol)
NO(g)	90.2	O ₂ (g)	0
NO ₂ (g)	33.2	NaOH(s)	-425.6
HCl(g)	-92.3	NaCl (s)	-411.2
H ₂ O (g)	241.8	H ₂ O (l)	-285.2
CH ₄ (g)	-74.8	CO ₂ (g)	-393.5