



Energy Changes and Rates of Reaction

1. Define thermochemistry, potential energy, kinetic energy, thermal energy, heat, temperature, enthalpy, molar enthalpy, specific heat capacity.
2. Identify a system vs. surrounding for a chemical reaction as well as an open vs. closed system.
3. Explain the role of heat in the forming and breaking of bonds as well as defining the terms endothermic and exothermic.
4. Solve question equations
$$Q = m \times c \times \Delta t$$
$$-m \times c \times \Delta t = +m \times c \times \Delta t$$
$$\Delta H = q / n$$
5. Use correct sign conventions for ΔH and recognize the formats for various thermochemical equations.
6. Use calorimetric data to determine the heat of a reaction.
7. State Hess's Law and experimentally illustrate Hess's Law.
8. Define standard heat of formation and calculate heat of reaction using tabulated of enthalpies of formation.
9. Compare the magnitude of energy involved in physical, chemical and nuclear change (fission vs. fusion reactions)
10. Define rate of reaction, importance and use appropriate units to express rate of reaction.
11. Interpret data from graphs of concentration vs. time of reactions.
12. Recognize physical properties used to monitor rates of reaction.
13. List factors that affect rates of reaction and experimentally determine these factors in the lab (catalysts, pressure, volume, temperature, concentration)
14. Outline the Collision Theory to explain how various factors create differences in reaction rate.
15. Draw and label potential energy diagrams for exothermic and endothermic reactions to show the enthalpy of reaction, activation energy and activated complex.
16. Define reaction mechanism and rate determining step.
17. Solve rate law equations.

