

## 21.10: End of Chapter Key Terms

### Physical and Chemical Reactions Key Terms

1. **Physical Change:** A change in which the form of matter is altered but one substance is not transformed into another, such as changes in state (solid, liquid, gas), shape, or size.
2. **Chemical Change:** A change that results in the formation of one or more new substances with different chemical properties and compositions, often involving a chemical reaction.
3. **Chemical Reaction:** A process in which substances (reactants) undergo chemical changes to form new substances (products), involving the breaking and forming of chemical bonds.
4. **Reactants:** The starting materials in a chemical reaction that undergo change to form products.
5. **Products:** The new substances formed as a result of a chemical reaction.
6. **Law of Conservation of Mass:** A principle stating that mass is neither created nor destroyed in a chemical reaction; the mass of the reactants equals the mass of the products.
7. **Exothermic Reaction:** A chemical reaction that releases energy to the surroundings, usually in the form of heat.
8. **Endothermic Reaction:** A chemical reaction that absorbs energy from the surroundings, usually in the form of heat.
9. **Activation Energy:** The minimum amount of energy required to initiate a chemical reaction.
10. **Catalyst:** A substance that increases the rate of a chemical reaction without being consumed in the process, by lowering the activation energy.
11. **Inhibitor:** A substance that decreases the rate of a chemical reaction or prevents it from occurring.
12. **Chemical Equilibrium:** A state in which the forward and reverse reactions occur at equal rates, resulting in no net change in the concentrations of reactants and products.
13. **Reversible Reaction:** A chemical reaction in which the products can react to reform the reactants.
14. **Irreversible Reaction:** A chemical reaction in which the products cannot easily reform the reactants.
15. **Precipitate:** An insoluble solid that forms and separates from a solution during a chemical reaction.
16. **Synthesis Reaction:** A type of chemical reaction in which two or more substances combine to form a more complex product ( $A + B \rightarrow AB$ ).
17. **Decomposition Reaction:** A type of chemical reaction in which a single compound breaks down into two or more simpler substances ( $AB \rightarrow A + B$ ).
18. **Single Replacement Reaction:** A type of chemical reaction in which one element replaces another element in a compound ( $A + BC \rightarrow AC + B$ ).
19. **Double Replacement Reaction:** A type of chemical reaction in which the ions of two compounds exchange places in an aqueous solution to form two new compounds ( $AB + CD \rightarrow AD + CB$ ).
20. **Combustion Reaction:** A chemical reaction in which a substance combines with oxygen, releasing energy in the form of heat and light, and producing carbon dioxide and water (usually).
21. **Oxidation:** The process in which a substance loses electrons during a chemical reaction.
22. **Reduction:** The process in which a substance gains electrons during a chemical reaction.
23. **Redox Reaction:** A chemical reaction involving the transfer of electrons from one substance to another, comprising both oxidation and reduction processes.
24. **Chemical Bond:** The attractive force that holds atoms or ions together in a compound.
25. **Covalent Bond:** A chemical bond formed by the sharing of electron pairs between atoms.
26. **Ionic Bond:** A chemical bond formed by the electrostatic attraction between oppositely charged ions.
27. **Bond Energy:** The amount of energy required to break one mole of bonds in a substance.
28. **Reaction Rate:** The speed at which a chemical reaction occurs, often measured as the change in concentration of reactants or products per unit time.
29. **Concentration:** The amount of a substance in a given volume, typically expressed in moles per liter (Molarity, M).
30. **Temperature:** A measure of the average kinetic energy of particles in a substance, affecting the reaction rate.
31. **Pressure:** The force exerted per unit area, influencing the reaction rate of gases.
32. **Surface Area:** The total area of the exposed surface of a solid, affecting the reaction rate.
33. **Equilibrium Constant (K):** A numerical value that expresses the ratio of the concentrations of products to reactants at equilibrium for a reversible reaction.
34. **Le Chatelier's Principle:** A principle stating that if a dynamic equilibrium is disturbed by changing the conditions, the position of equilibrium will shift to counteract the change.

- 35. **Reaction Mechanism:** The step-by-step sequence of elementary reactions by which overall chemical change occurs.
  - 36. **Intermediate:** A species that appears in some steps of a reaction mechanism but not in the net equation.
  - 37. **Transition State:** A high-energy state during a chemical reaction where old bonds are breaking and new bonds are forming.
  - 38. **Chemical Kinetics:** The study of the rates of chemical processes and the factors that affect them.
  - 39. **Energy Profile Diagram:** A graphical representation of the energy changes that occur during a chemical reaction.
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