

# Outline of Chemistry

## Chapter 1 Introduction

1.1 The properties and changes of matter; physical and chemical changes

1.2 The object chemistry study with

1.3 Matter and classification of matter

Element, Compound and Mixture

1.4 Separation Methods

Filtration; Distillation and Chromatography

## Chapter 2 Atomic Structure

2.1 Atom The discovery of atomic structure;

2.2 Electrons, Protons and Neutrons

2.3 Isotopes

2.4 Mass Number; Average Relative Atomic Mass of an Element

2.5 Electron Configurations

The meaning and writing of electronic structure of element 1-18

2.6 Ions

Electronic structure of simple ions, hydroxyl ion and ammonium ion

## Chapter 3 Chemical Bond

3.1 Concept of chemical bond

3.2 Representative substance of ionic bond, covalent bond and metallic bond

3.3 Using electronic structure to describe the formation of ionic bond and covalent bond

## Chapter 4 Chemical Equation

4.1 Law of Conservation of Mass

4.2 How to Write Chemical Equation

4.3 How to Balance Chemical Equation

4.4 Types of Chemical reaction

## **Chapter 5 Energy Transformation**

### **5.1 Energy Changes in Solution**

Dissolution equilibrium and crystallization process; Transformation during the process of dissolution

### **5.2 Energy Changes During Chemical Reaction**

Exothermic and Endothermic reaction; Neutralization Reaction is Exothermic Reaction

## **Chapter 6 Solution**

### **6.1 Formation of Solution**

Solute and Solvent

### **6.2 Types of Solutions**

Unsaturated; Saturated and Supersaturated

### **6.3 Factors Affecting Solubility**

### **6.4 Ways of Expressing Concentrations of Solutions**

Mass Percentage; Parts per Million (ppm) and Parts per Billion (ppb)

## **Chapter 7 Acid and Base**

### **7.1 Definitions of Acid-Base**

Arrhenius and Brønsted–Lowry Theory

### **7.2 Acid and Base Strength**

Strong Acid and Base, Weak Acid and Base

### **7.3 Neutralization Reactions**

## **Chapter 8 Periodic Table**

### **8.1 Periodic Law**

Rule of Properties Changing of Main Group Elements; Rule of Properties Changing of Short Period Cycle

## **8.2 Structure of Periodic Table**

The Relationship between Periodic Table And Atomic Structure

## **8.3 Application of Periodic Table**

# **Chapter 9 Alkali Metals**

## **9.1 Physical Properties**

Color, State, density

## **9.2 Chemical Properties**

Reactions of Na and K with oxygen, water, halogens

## **9.3 Preparation and Properties of $\text{Na}_2\text{CO}_3$ , NaCl, NaOH and $\text{NaHCO}_3$**

## **9.4 Electronic Configuration**

# **Chapter 10 Alkaline Earth Metals**

## **10.1 Physical Properties**

Color, State, density

## **10.2 Chemical Properties**

Reactions of Ca and Mg with oxygen, water, halogens

## **10.3 Electronic Configuration**

## **10.4 Industrial use of lime and limestone**

Application of lime and limestone

## **10.5 Hard water**