

UNIT 12

PERIODIC CLASSIFICATION OF ELEMENTS

Learning Objectives

After completing this lesson, students will be able to

- know the concept of classification of elements in early days.
- understand the postulates, advantages and limitations of modern periodic table.
- understand the classification of elements based on the electronic configuration.
- learn about the position of hydrogen in the periodic table.
- study about the position of rare gases (Noble gases) in the periodic table.
- distinguish between metals and non-metals.
- know about metalloids and alloys.



Introduction

We live in the world of substances with great diversity. Substances are formed by the combination of various elements. All the elements are unique in their nature and property. To categorize these elements according to their properties, scientists started to look for a way. In 1800, there were only 31 known elements. By 1865, their number became 63. Now 118 elements have been discovered. As different elements were being discovered, scientists gathered more and more information about the properties of these elements. They found it difficult to organize all that was known about the elements. They started looking for some pattern in their properties, on the basis of which they could study such a large number of elements with ease. Let us discuss the concepts of classification of elements proposed by various scientists from early to modern period.

12.1. Early Concepts of Classification of Elements

12.1.1. Dobereiner's Triads

In 1817, Johann Wolfgang Dobereiner, a German chemist, suggested a method of grouping elements based on their relative atomic masses. He arranged the elements into groups containing three elements each. He called these groups as 'triads' (tri – three).

Dobereiner showed that **when the three elements in a triad are arranged in the ascending order of their atomic masses, the atomic mass of the middle element is nearly the same as average of atomic masses of other two elements.** This statement is called the Dobereiner's law of triads. Table 12.1 shows the law of triads proposed by Dobereiner.

Example: In the triad group (1), arithmetic mean of atomic masses of 1st and 3rd elements,