

UNIT

11

ATOMIC STRUCTURE

Learning Objectives



After studying this chapter, students will be able to

- understand Rutherford's gold foil experiment.
- identify the limitations of Rutherford's model.
- explain the main postulates of Bohr's atomic model.
- compare the charge and mass of sub-atomic particles.
- calculate number of protons, neutrons and electrons from the given atomic number and mass number of an element.
- draw the atomic structure of first 20 elements.
- differentiate isotopes, isobars and isotones.
- assign valency of various elements based on the number of valence electrons.
- recognize the significance of quantum numbers.
- state and illustrate the laws of multiple proportion, reciprocal proportion and combining volumes.

Introduction

Just as a small child wants to take a toy apart to find out what is inside, scientists have for long been curious about the internal structure of an atom. They wanted to find out what are the particles present inside an atom and how are these particles arranged in an atom. For explaining this many scientists proposed various atomic models.

We have learnt Dalton's atomic theory and J.J. Thomson's model in class VIII. Now we will learn about sub-atomic particles and the other atomic models to explain how these particles are arranged within an atom.

11.1 Discovery of Nucleus

In 1911, Lord Rutherford, a scientist from New Zealand, performed his famous

experiment of bombarding a thin gold foil with very small positively charged particles called alpha(α) particles. He selected a gold foil because, he wanted as thin layer as possible and gold is the most malleable metal.

He observed that:

1. Most of the alpha particles passed straight through the foil.
2. Some alpha particles were slightly deflected from their straight path.
3. Very few alpha particles completely bounced back.

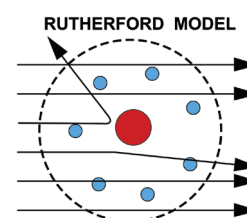


Figure 11.1 Deflected α -particle