

# Chemistry Study Materials for Class 9 (NCERT Questions –Answers of Chapter -04)

Ganesh Kumar

Date:- 07/07/2021

---

## Structure of the Atom

### STRUCTURE OF THE ATOM

Atoms are the basic units of matter and the defining structure of elements. Matters are made of tiny particles called atom. Atom is made of three particles; electron, proton and neutron. These particles are called fundamental particles of an atom or sub atomic particles.

**Electron ( $e^-$ )** - Electron is denoted by 'e' and is a negatively charged particle.

The absolute charge over an electron is equal to  $1.6 \times 10^{-19}$  of negative charge and is considered equal to  $-1$ . The relative mass of electron is  $1/1836$ . Since the mass of an electron is very small, thus it is considered equal to 0. Electrons revolve round the nucleus of atoms.

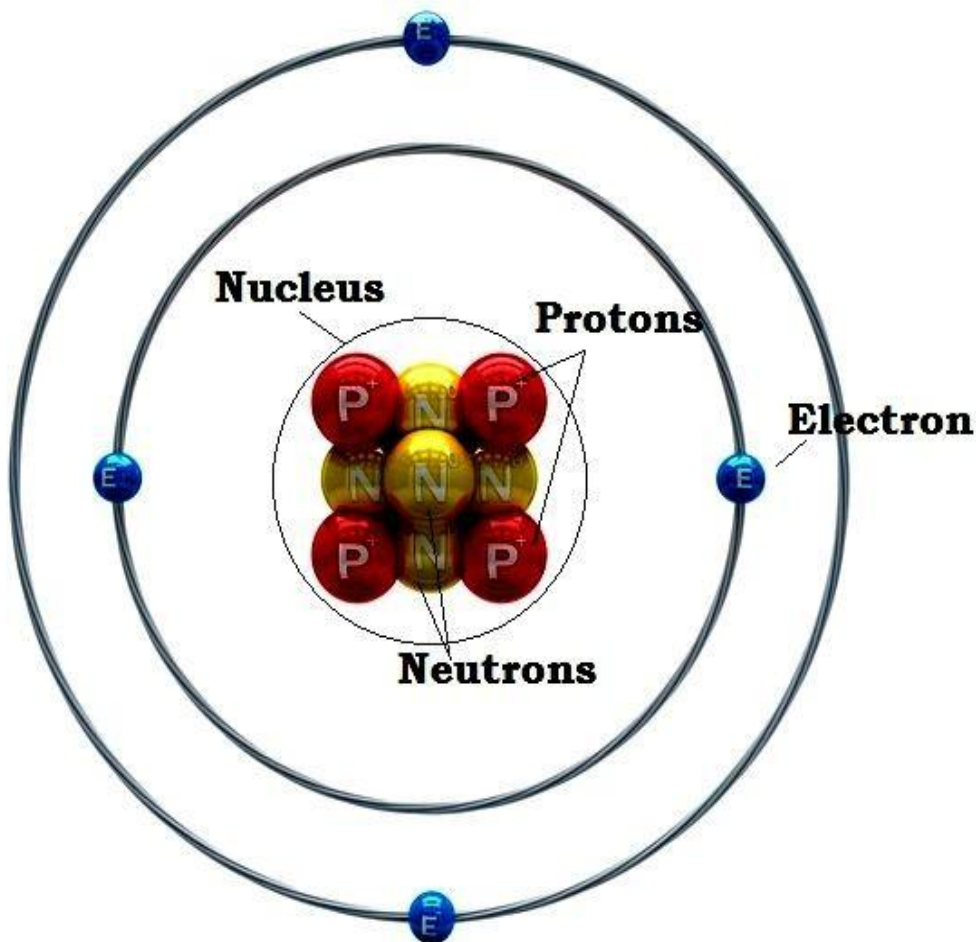
**Proton ( $p^+$ )** - Proton is denoted by 'p' and is positively charged particle. The absolute charge over proton is  $1.6 \times 10^{-19}$  coulomb of positive charge and it is considered as unit positive charge. Thus absolute charge over a proton is equal to  $+1$ .

The absolute mass of a proton is equal to  $1.65 \times 10^{-24}$  g and considered equal to 1 as it is equal to the mass of 1 hydrogen atom. Proton is present in the nucleus of atom.

**Neutron (n)** – Neutron is denoted by 'n' and is a neutral particle.

The absolute mass of neutron is  $1.67 \times 10^{-24}$  g. The relative mass of neutron is equal to 1. Neutron is presents in the nucleus of atom.

**Nucleus** – The centre of atom is called nucleus. Nucleus comprises of neutron and proton. Nucleus of an atom contains the whole mass of an atom.



### INTEXT QUESTIONS PAGE NO. 47

**Q1. What are canal rays?**

**Answer:** Canal rays are positively charged radiations that can pass through perforated cathode plate. These rays consist of positively charged particles known as protons.

**Q2. If an atom contains one electron and one proton, will it carry any charge or not?**

**Answer:** An electron is a negatively charged particle, whereas a proton is a positively charged particle. The magnitude of their charges is equal. Therefore, an atom containing one electron and one proton will not carry any charge. Thus, it will be a neutral atom.

## Discovery of Electron

In 1897; J. J. Thomson, a British physicist, proposed that atom contains at least one negatively charged particle. Later this particle was named as electron.

Thomson called those particles 'corpuscles'.

## Discovery of Proton:

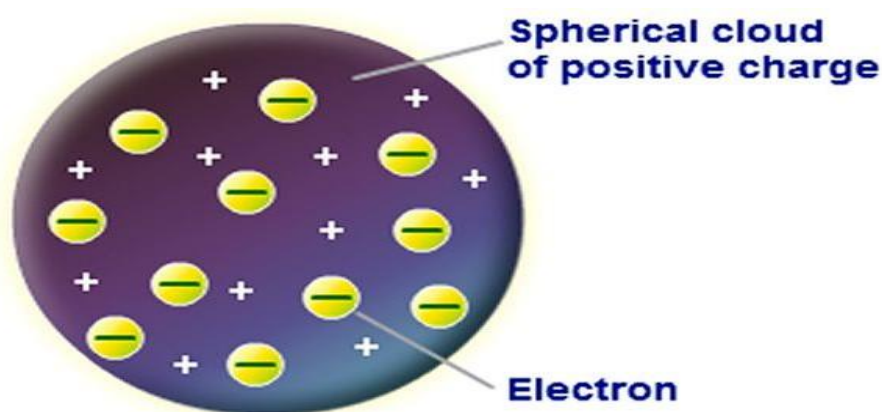
Ernest Goldstein in 1886 discovered the presence of new radiation in gas discharge tube even before the identification of electron. He called these rays as Canal Rays. His experiment led to the discovery of proton.

## Discovery of Neutron:

In 1932 J. Chadwick discovered another subatomic particle called neutron. Neutron is present in the nucleus of all atoms.

## THOMSON'S MODEL OF ATOM

J. J. Thomson proposed the model of atom similar to a Christmas pudding or similar to a water melon. His model of atom is generally called plum and pudding model of atom.



### Thomson's Plum pudding model

He proposed that electrons are embedded the way black seeds of water melon are embedded; in the sphere of positive charge. According to Thomson

- (a) An atom consists of positively charged sphere in which electrons are embedded.
- (b) The quanta of negative and positive charges are equal. The equal number of negative charge and positive charge makes an atom electrically neutral.

## **RUTHERFORD'S MODEL OF ATOM**

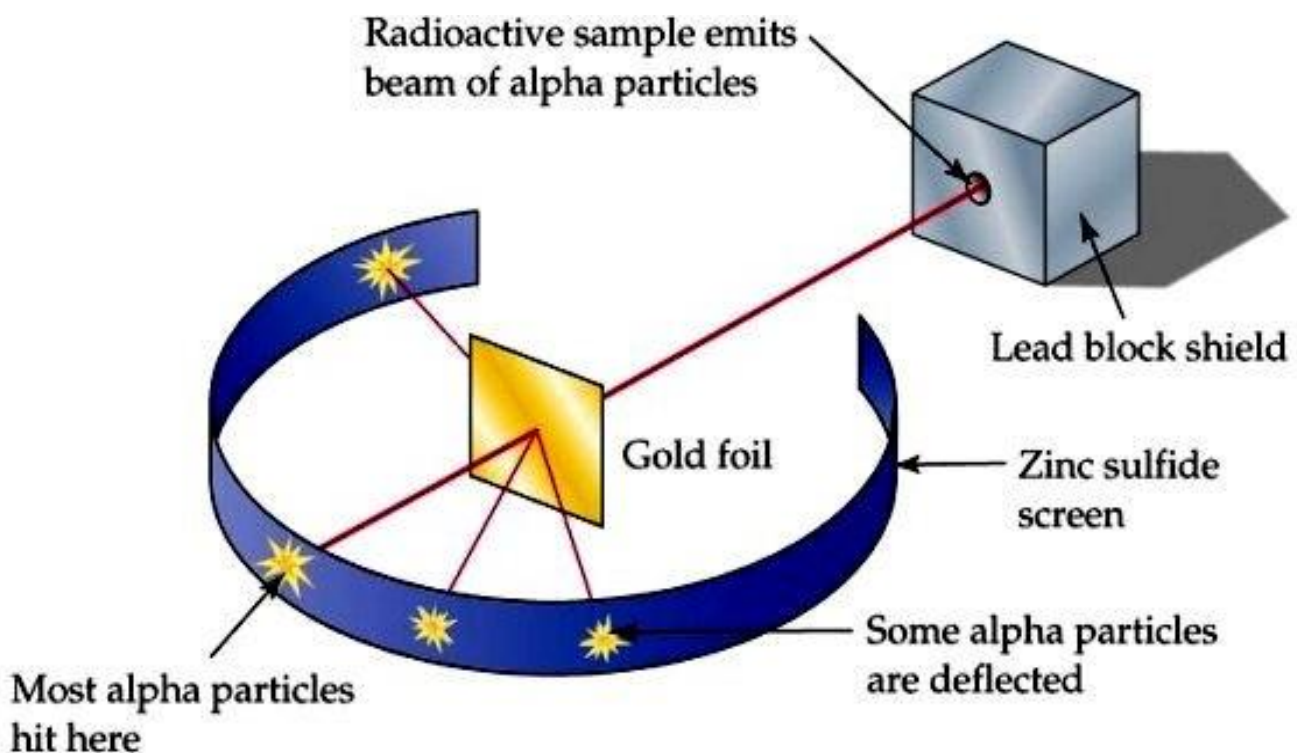
Ernest Rutherford in 1909 with his team bombarded very thin gold foil with  $\alpha$  – particles. He found that

- (a) Most of the  $\alpha$  – particles passed without any hindrance.
- (b) Some of the  $\alpha$  – particles deflected from their original path at noticeable angle.
- (c) Very few of the  $\alpha$  – particles bounced back at their original path.

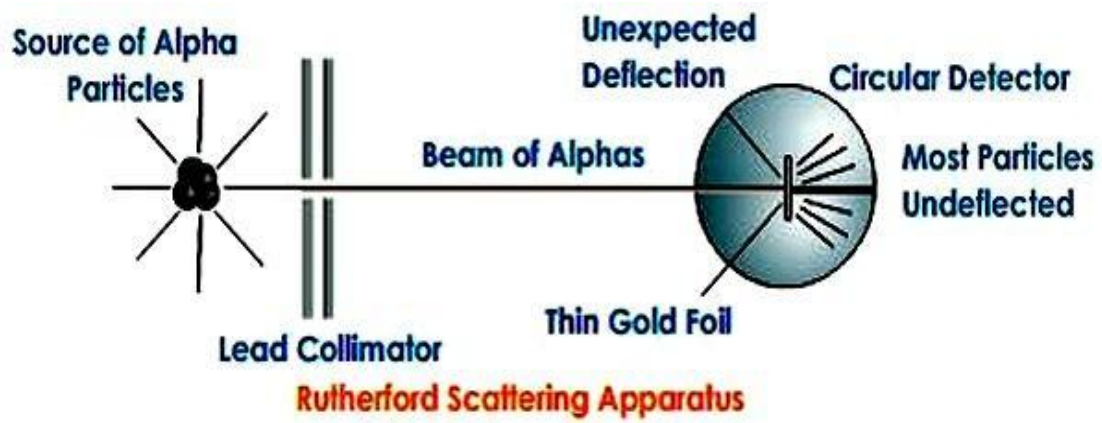
On the basis of his observation, he proposed the model of atom. The

Rutherford's Model of Atom is as follows:

- (a) Most of the part in an atom is empty.
- (b) There is a positively charged center in atom, which contains nearly the whole mass of atom. The centre is called nucleus.
- (c) The size of nucleus is very small compared to an atom.
- (d) Electrons revolve round the nucleus



The Rutherford's Experiment is also known as Geiger-Marsden Experiment.



\*\*\*\*\*