

Chapter 4

STRUCTURE OF ATOM

Rutherford atomic model:

→ It is based on α - ray scattering experiment.

Postulates:

- Positively charged part of atom is present in a very small space at the centre, which is named as “Nucleus”.
- The word "Nucleus is introduced by Rutherford.
- Nucleus is present at the centre of atom and electrons are revolving around the nucleus like planets revolve around sun.

This model is also called Solar atomic model (or) Planetary model (or) Nuclear model.

- The election revolving around the nucleus is balanced by two forces acting in opposite direction.
 - (i) Electrostatic force of attraction between electron and nucleus, which pulls the electron towards nucleus.
 - (ii) Centrifugal force arised due to circular motion of electron which pulls the electron away from the nucleus.
- Rutherford calculated the radius of nucleus is 10^{-15} m (or) 10^{-13} cm, similarly radius of atom as 10^{-10} m (or) 10^{-8} cm.
So, size as atom is 10^5 times more them size of nucleus.

Drawbacks:

- When a charged particle is having circular motion, It must lose energy, according to quantum mechanics.
- If election lose energy, its centrifugal force is reduced and electron has to be pulled towards nucleus.
- If so electron needs to take spiral path and finally merge into nucleus.
- So Rutherford's atomic model could not correlate with quantum mechanics.