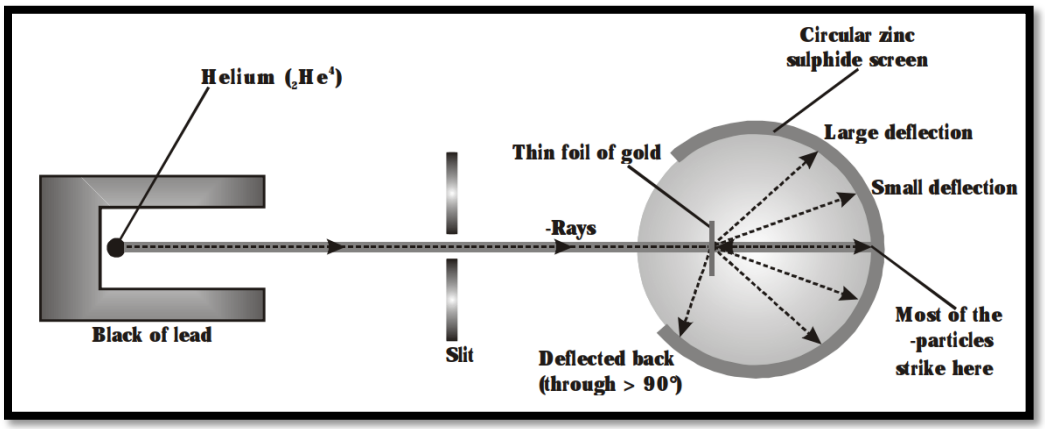
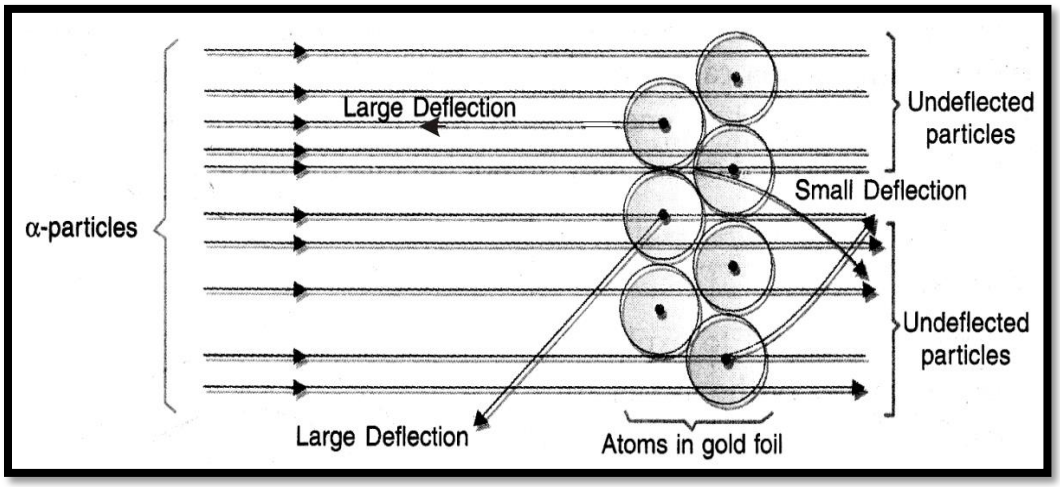
STRUCTURE OF THE ATOM
Rutherford's Atomic Model

❖ RUTHERFORD'S MODEL OF THE ATOM (DISCOVERY OF NUCLEUS)



In 1911, scientist "Ernest Rutherford" gave a new picture for the structure of atom by his a-particle scattering experiment & proposed the structure of atom. a particle are charged particles having 2 unit of positive charge and 4 units of mass, that is a-particle (2^{He4}) are doubly charged helium atom (He^{+2})

❖ Rutherford Experiment:



- When fast moving alpha particles strike very thin gold foil in vaccum, it is found that:

  Most of the fast-moving a-particles passed straight through the gold foil, without any deflection from their original part.

- Some of the a-particles were deflected by the foil by small angles and few are deflected through large angles.
- A very few alpha particles completely rebound on hitting the gold foil and turn back on their path.

❖ Conclusion of Rutherford experiment:

Rutherford concluded from the a-particle scattering experiment that

- Most of the space inside the atom is empty because most of the a-particle passed through the gold foil without getting deflected.
- Very few particles were deflected from their path, indicating that the positive charge of the atom occupies very little space.

  A very small fraction of a-particles were deflected by 180°, indicating that all the positive charge and mass of the gold atom were concentrated in a very small volume within the atom.

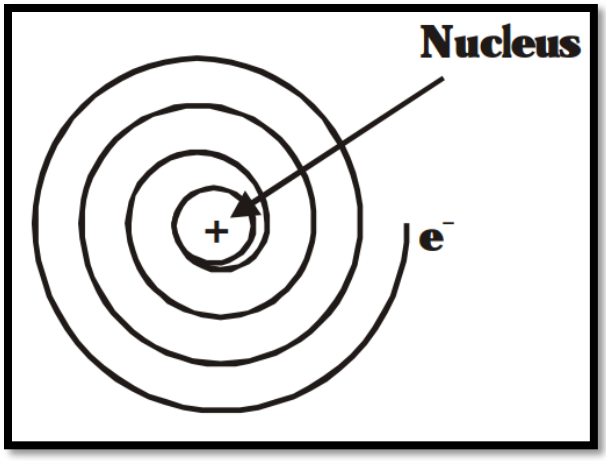
  On the basis of this experiment, Rutherford put forward the nuclear model of an atom, which has the following features.
- There is a positively charged centre in an atom called the nucleus. Nearly all the mass of the an atom resides in the nucleus.
- The electrons revolve around the nucleus in well-defined orbit.
- The size of the nucleus is very small as compared to the size of the atom.

Ques. On the basis of Rutherford's model of an atom, which subatomic particle is present in the nucleus of an atom? **[NCERT]**

DO YOU KNOW: Radius of nucleus is 10^{-15}m radius of atom is 10^{-10}m.

❖ Drawback of the Rutherford Experiment:

According to **Maxwell,** if an electrically charged particle revolves around circular path, then it always radiate out energy Thus. If an electron moves around the nucleus, it must continuously radiate out energy and hence, gradually more towards nucleus in a spiral path, till it collide with nucleus.


Nucleus
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