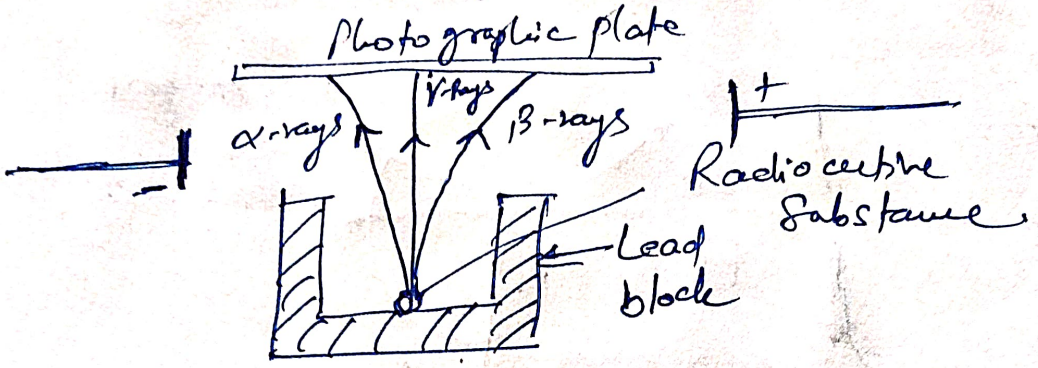
Radioactivity →

The spontaneous emission of active radiations by certain elements like Uranium is called radioactivity and the elements are called radioactive elements.

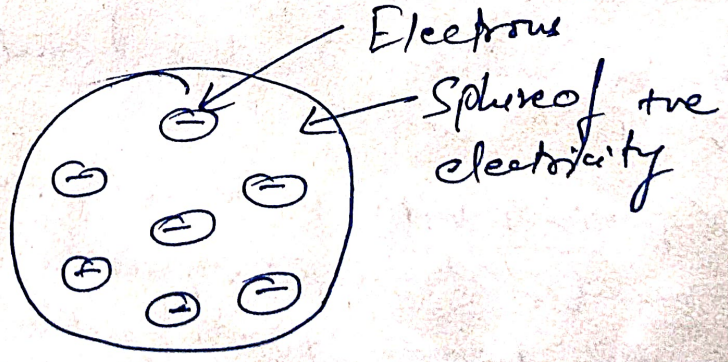


α-rays → positively charged He^{2+} particles.
→ 3.20×10^{-19} C (charge)
→ 6.6×10^{-24} g (mass)

β-rays → electrons
γ-rays → high energy electromagnetic radiations

Thomson's model. (1898)

An atom consists of a uniform sphere of positive electricity in which electrons are distributed more or less uniformly. Also k/a plum-pudding model or raisin pudding model or watermelon model.



Thomson's model of atom.

(4) Rutherford's nuclear model of atom.

Alpha particle scattering experiment

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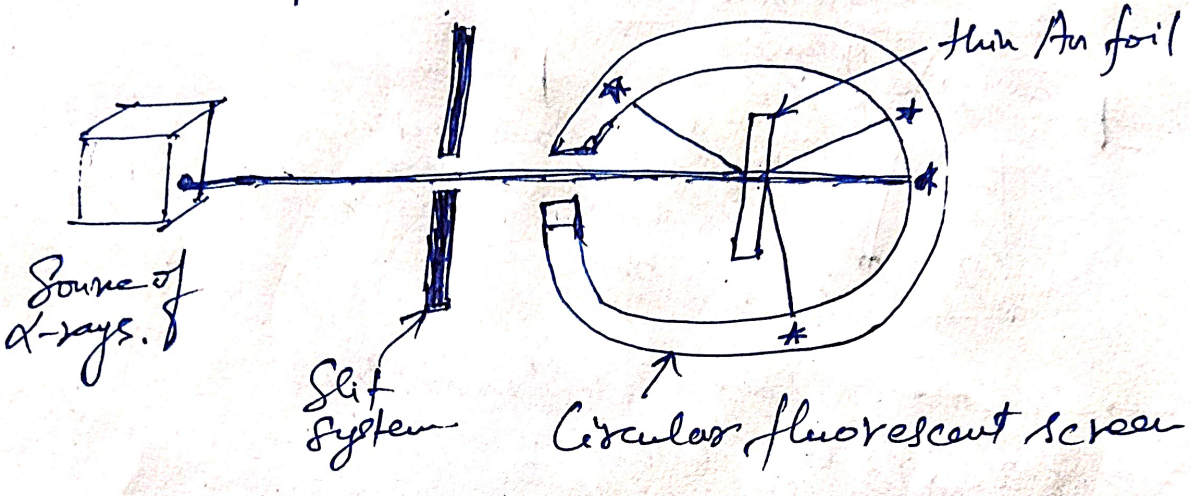
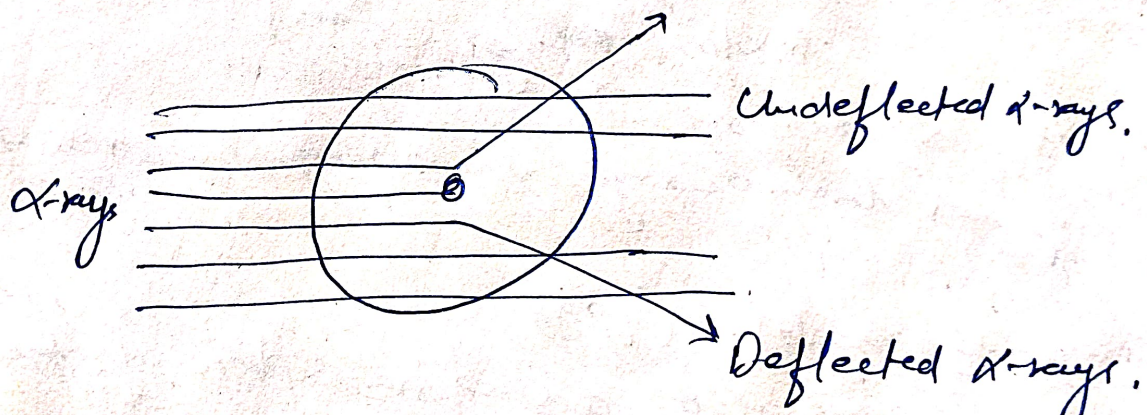
Bombardment of a thin sheet of Au (10^{-5} cm) by α-particles.





i) Most of the α-particles pass through the foil undeflected

↓

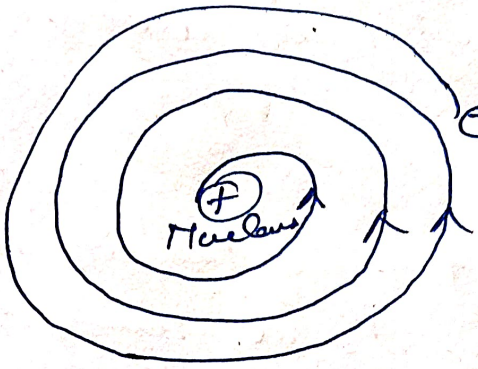
most of the space in an atom is empty.

ii) The small angle of deflection of α-particles indicated the presence of a heavy positive centre in the atom called nucleus.

iii) No. of α-particles with large angle deflection is small. Since the number of such α-particle is small, the space occupied by the ~~heavy~~ the centre must be small.

Failure of Rutherford's model.

Maxwell's electromagnetic theory → a charge particle when accelerated emits energy, in the form of electromagnetic radiations.



It failed to explain the stability of atoms and existence of certain definite lines in the hydrogen spectrum.

Neutron →, James chadwick (1932)

$$^{9}_{4}Be + ^{4}_{2}He \longrightarrow ^{12}_{6}C + ^{1}_{0}n$$

mass of neutron → 1.675×10^{-27} kg

Atomic Number → (Z)

The number of unit positive charges on the nucleus of an atom of the element is called atomic number of the element.

Atomic Number (Z) = Number of protons.
= Number of electrons.

$$^{\text{Mass No. } A}_{\text{Atomic No. } Z}X \leftarrow \text{Symbol of elements}$$