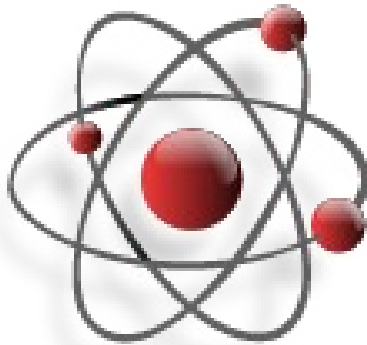


UNIT II

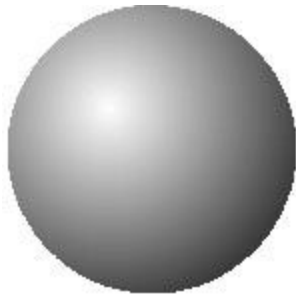
Atomic structure.





Democritus

- The first scientist that used the word atom that means **INDIVISIBLE**.



**Democritus
(400 B.C.)**

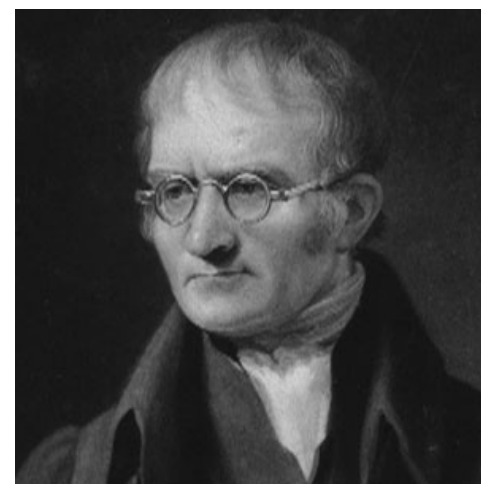




Dalton

Dalton based his theory in the following:

- Law of the gases
- Law of partial pressures
- Law of conservation of matter
- Law of definite proportions
- Law of multiple proportions





Dalton

Dalton's atomic theory postulates

2. Matter can be divided until a limit point, the indivisible particles are called atoms.
3. Atoms of the same elements are identical
4. Atoms of different elements are different and have different weight and properties.
5. Atoms can not be destroyed or created.
6. The smallest portion of a compound is a molecule.
7. When atoms are combined to form compounds, they form identical molecules, with the same proportion of atoms of one and the other element
8. Two or more atoms can be combined of different ways to form more then one type of compound.
9. The most stable and abundant compounds are those formed of just two different atoms.



Thomson

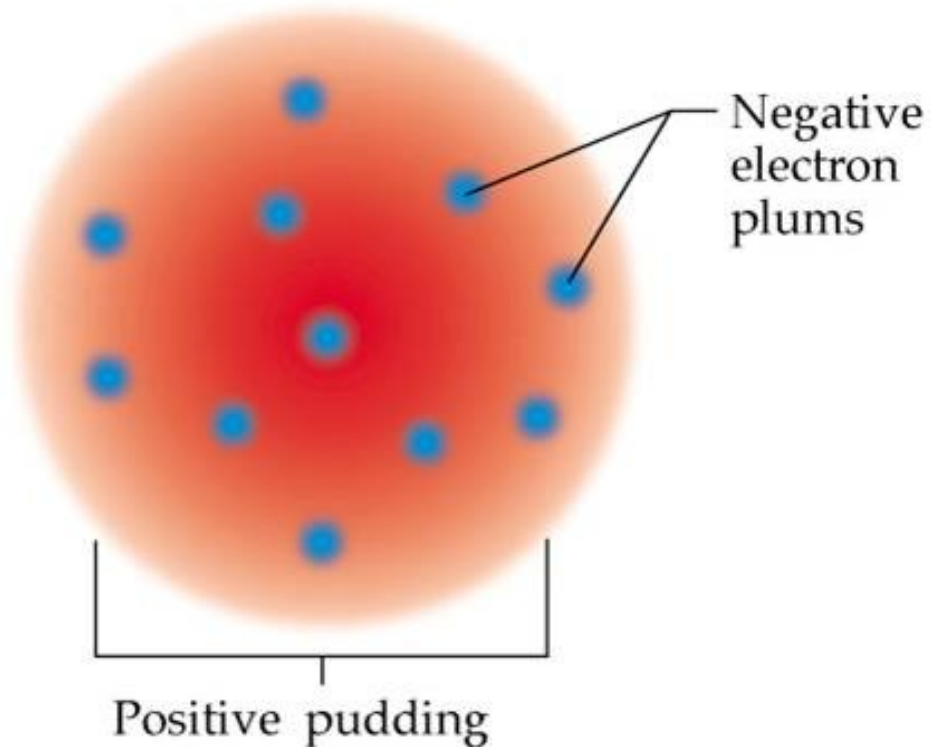
- Thomson is most credited for the discovery of the **electron** and **isotopes**.
- He observed with the cathode ray experiment that there were small object. particles moving in the tube to each end, in bright flashed of light. He concluded that the small particles had to have a negative charge in order to be attracted to the ends. He named the small particles "electrons".



Thomson model



Thomson plum pudding model of the atom

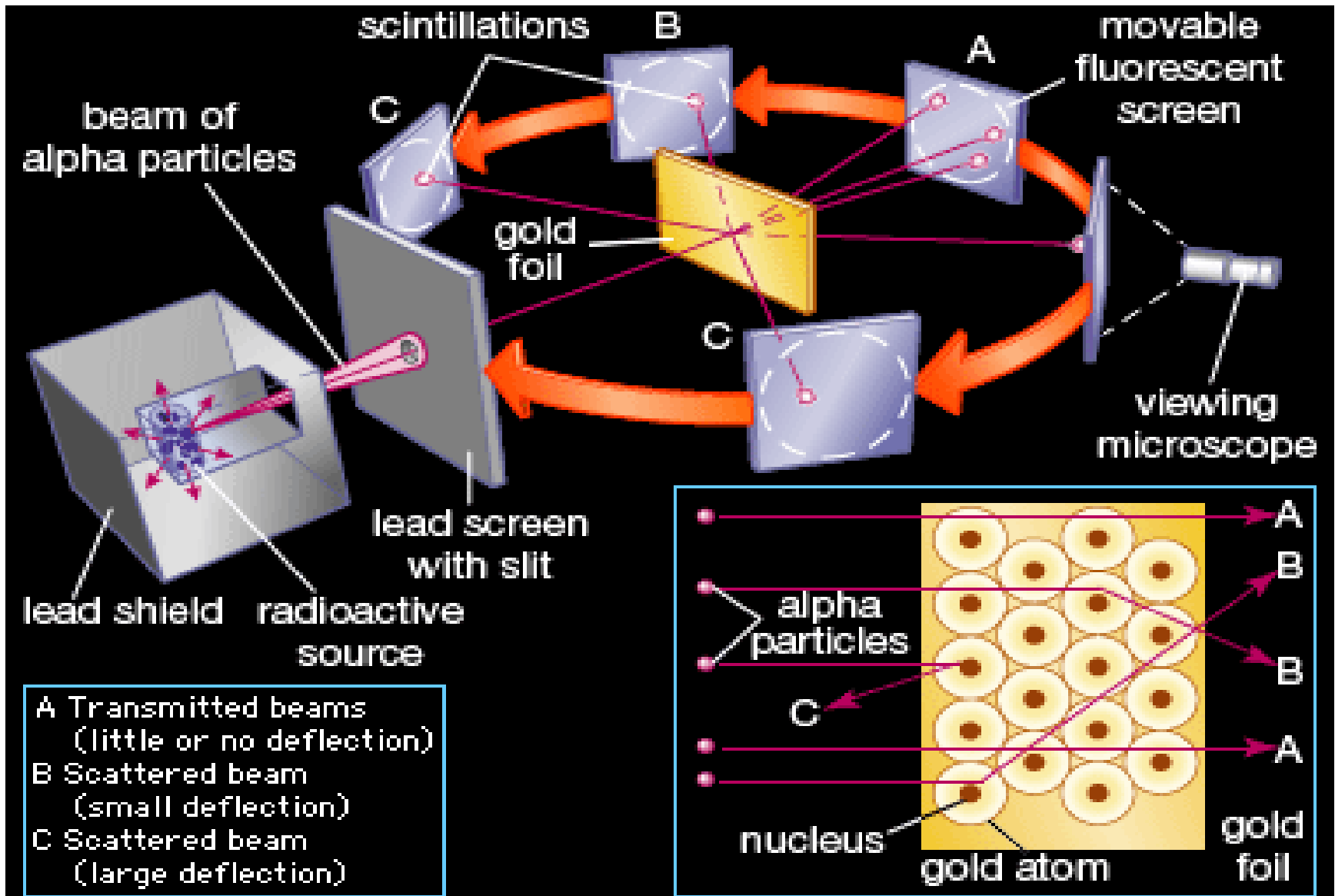




Rutherford

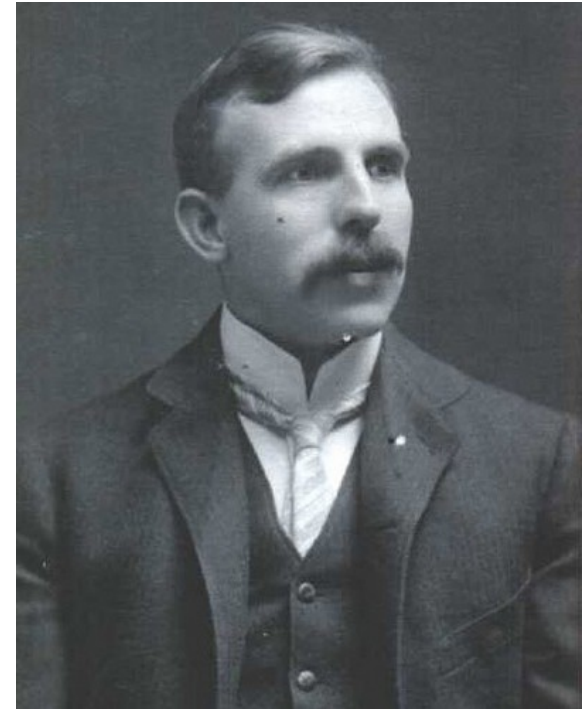
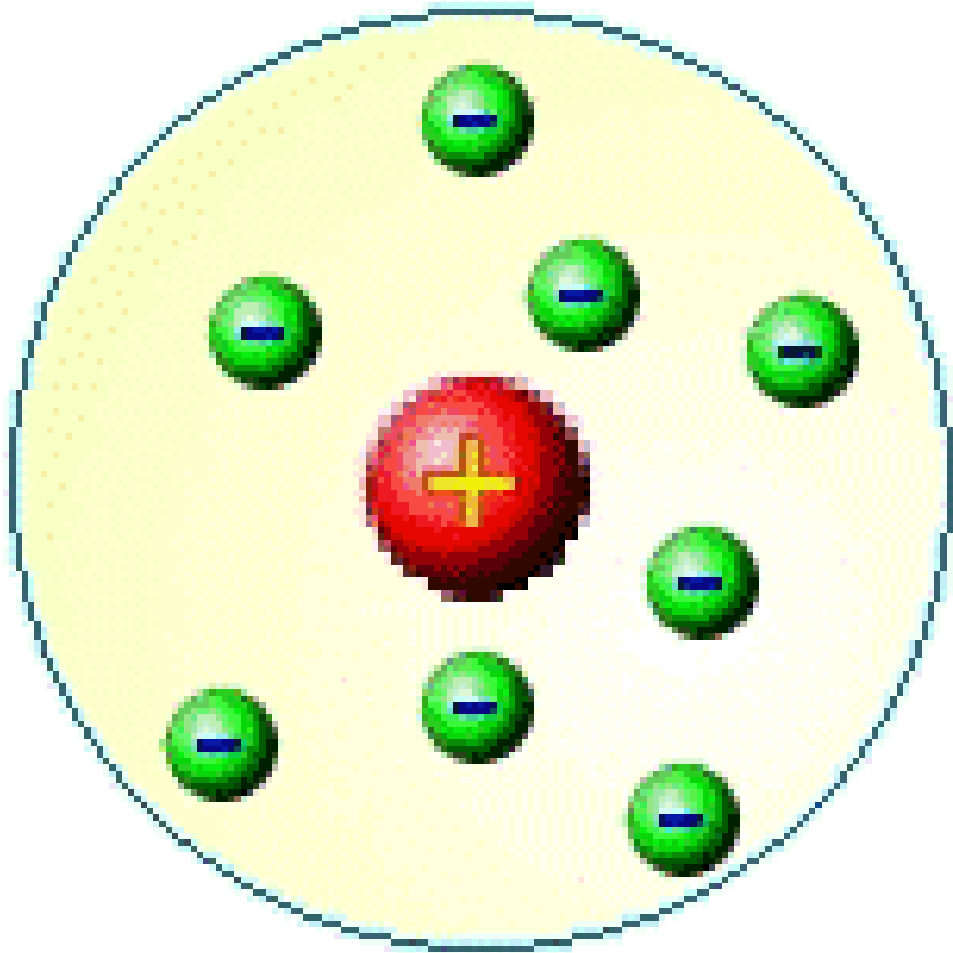
- Rutherford is most famous for the discovery of the atom's **nucleus**.
- He performed the "Gold Foil" experiment, in 1909. He set a ring around a piece of gold foil. The ring was made of lead to prevent any particles from escaping. He then took a piece of radium and directed at the thin piece of gold foil. He thought that the radioactive particles would go right through the thin sheet, but instead he found the contrary. Some of the particles bounced straight back at the source, much different than what he expected.
- He concluded that the atoms in the foil must have a small, centralized mass which could not be penetrated. The radioactive particles had gone through the empty spaces, but could not go through the "nucleus". Rutherford's discovery was pivotal in the world of chemistry. His discoveries lead to the development of the Rutherford model, in which particles orbited a dense center space. He also stated that atoms are mostly empty space, and most of their mass is in the nucleus.

Gold foil experiment





Rutherford Model





Chadwick

- Chadwick is best known for the discovery of the neutrally charged particle called the **neutron**.
- He found the neutron when he put an excessive charge into an atom; some of the particles remained unaffected. He named the particles, Neutrons, because they had a neutral charge. His discovery of excessively charging atoms also led to discovering that he could split heavy elements, like uranium 235.
- This discovery was key to the development of the atomic bomb. These elements are located on the bottom of the periodic table.



Radiation

- **radiation** describes any process in which **energy** emitted by one body travels through a medium or through space, ultimately to be absorbed by another body.
- When an unstable nucleus decays, there are **three** ways that it can do so.
It may give out:-
 - an **alpha particle** (we use the symbol α)
 - a **beta particle** (symbol β)
 - a **gamma ray** (symbol γ)



Types of Radiation

- Alpha - these are fast moving helium atoms, positive charged.
- Beta - these are fast moving electrons. Since electrons are much lighter than helium atoms, they are able to penetrate further, through several feet of air, or several millimeters of plastic or less of very light metals.
- Gamma - these are photons, just like light, except of much higher energy. X-Rays and gamma rays are really the same thing, the difference is how they were produced.

α Alpha



β Beta



γ Gamma



Paper

Aluminum

Lead

