Chemistry

Atomic Structure

Developing the model of the atom

Dalton's model 1803

- Atoms are solid balls
- cannot be broken down into smaller parts
- atoms of same element are identical
- atoms of different elements are different
- chemical reaction will be equal to rearrangement of atoms

Thomson's model 1897- plum pudding model

- Discovery of electron
- atoms are the sphere of positive charges
- negative electrons are embedded in it
- over all atom is neutral

Alpha scattering experiment 1907 till 1911

Ratherford Gigar and mardson

ratherford fired Alpha particles at the thin gold foil

Observations

- Most particles pass through it means atom has mostly empty space
- some particles are deflected it means positive mass is in the centre

- few bounced back it means nucleus is very small dense and positive

Rutherford nuclear model 1911

- Atom has a small positively charged nucleus
- Electrons Orbit around the nucleus in a cloud

Bohr's model 1913

- solve problems of electron collapse
- electrons Orbit nucleus in fixed energy levels called shells
- electrons can move between shells by absorbing or releasing energy

Chadwicks Discovery 1932

- He proved the existence of neutrons that are neutral particle

Current model of the atom

- Nucleus has protons and neutrons
- protons has positive charges and neutron has negative charges
- nucleus has most of the mass but very small as compared to
- atoms are neutral if protons are equal to electrons

- movement of electron
- when electron moves from lower shell to higher shell they will release energy
- when electrons move from higher shell to lower shell there will absorb energy

Isotopes

- Atoms of the same element with same protons but different neutrons
- Same chemical properties but different message
- example carbon 12 and carbon 14

Ionizing radiations

- Now there are three ionizing radiations alpha beta and gamma

Alpha

- Alpha has two protons and two neutrons they are very heavy and with low penetration and high ionization

Beta

- electron emitted when neutron turns into proton It has medium penetration and medium ionization

Gamma

- they are called EM waves called electromagnetic waves Gamma

radiations are very heavy and they do very high penetration and they have very low ionization

Half life

- Time taken for half the nuclei in the radioactive sample to decay
- It is important for dating rocks medical traces and nuclear safety

Irradiation and contamination

Irradiation

- Exposure to the radiation from outside is called a radiation
- it doesn't make the object Radioactive
- example medical sterilization using Gamma rays

Contamination

- radioactive particles enter or land on the objects
- they are dangerous because continuously and its radiation until removed or Decay
- Example inhaling radioactive dust