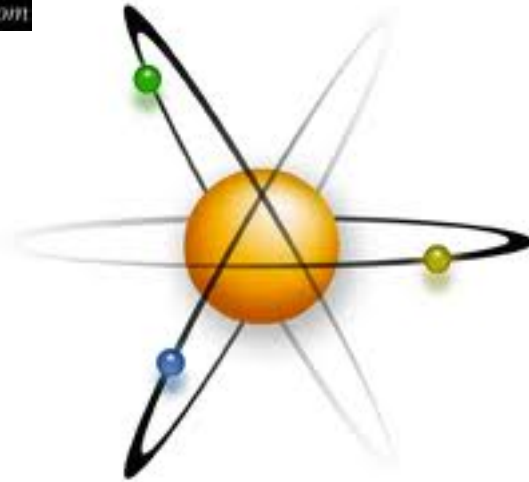
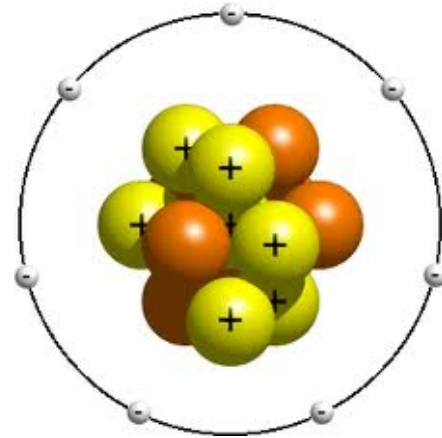


Atomic Model



Atomic Models

- John Dalton in the 1800s developed the Atomic Theory of Matter
- Stated that all matter is made up of atoms and different elements are made of different kinds of atoms



Thomson's Atomic Model (1897)

- J.J. Thomson did an experiment using magnets and discovered that every atom has negatively charged particles.



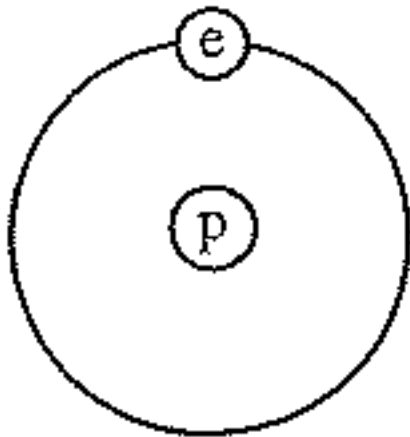
Rutherford's model (1909)

- Discovered that there was a clump of positive charged particles in the center of the atom.
- Later Chadwick discovered neutrally charged atoms also in the nucleus.



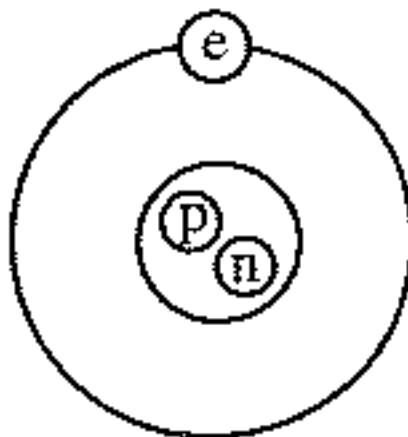
Isotopes

- Atoms of the same element that have different numbers of neutrons.
- Some elements have more than one naturally occurring type of isotope



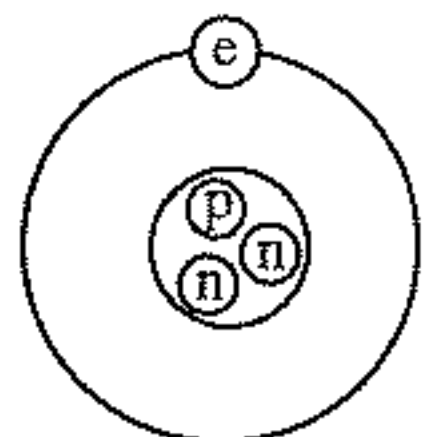
${}^1\text{H}$ Hydrogen

1



${}^2\text{H}$ Deuterium

1

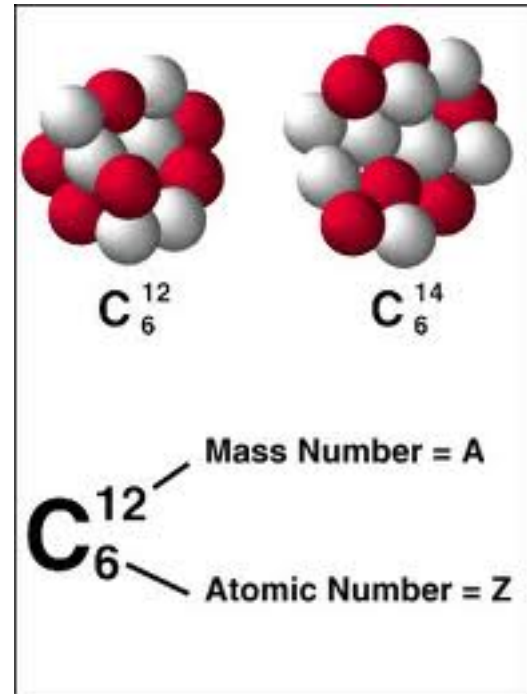


${}^3\text{H}$ Tritium

1

Naming Isotopes

- Named by the atom's mass number – the number of protons plus the number of neutrons in its nucleus.



Isotope Examples

- Carbon 12 – 6 protons, 6 neutrons ($12-6=6$)
- Carbon 13 – 6 protons, 7 neutrons ($13-6=7$)
- Carbon 14 – 6 protons, 8 neutrons ($14-6=8$)



Carbon-12
6 protons
6 neutrons
6 electrons



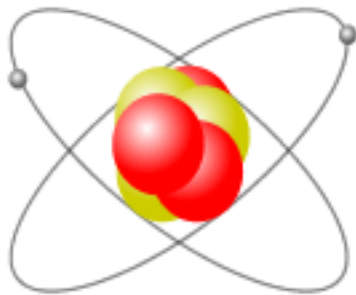
Carbon-13
6 protons
7 neutrons
6 electrons



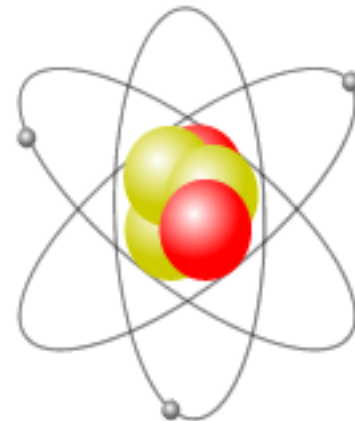
Carbon-14
6 protons
8 neutrons
6 electrons

Ions

- An atom with an electrical charge
- Positive: more protons than electrons
- Negative: more electrons than protons



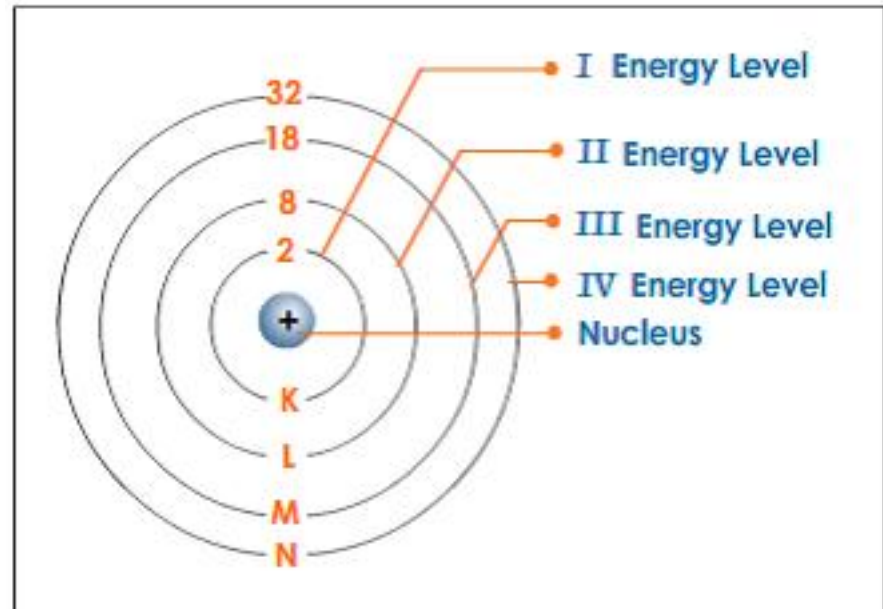
Positive Ion
3 Protons
2 Electrons



Negative Ion
2 Protons
3 Electrons

Shells

- The energy levels where electrons orbit the nucleus of an atom
- Each shell can hold a certain number of electrons (2, 8, 18, 32)



Valence Shell

- The outside shell of any atom
- Atoms with few electrons in the outer shell tend to lose electrons
- Atoms with many electrons in the outer shell tend to gain electrons

