

Atomic Structure

1-All matter is composed of basic particles called atoms.

2-88 of the first 92 elements exist in nature. Elements 43, 61, 85 and 87 are too unstable and don't exist long enough to be found, but they have been produced in small amounts in nuclear reactions. Another 21 elements are man made for a total of 112 elements

3-All atoms are composed of smaller particles

- A. Protons; positive charge, atomic mass unit of 1, located in nucleus,(the central core of the atom)
- B. Neutrons; neutral, atomic mass unit of 1, also located in nucleus
- C. Electrons; negative charge, assigned an atomic mass unit mass of 0 (electron mass is about $1/1836$ that of a proton, so it is essentially zero when determining the atom's mass), located in region outside of nucleus. Electrons don't simply orbit around an atom in a defined path, but it's probable location is somewhere around the nucleus. This is called the "Electron Cloud Model.

4-The type of element depends on the number of protons in the atom, called the atomic number. In an electrically neutral atom the number of protons is the same as the number of electrons.

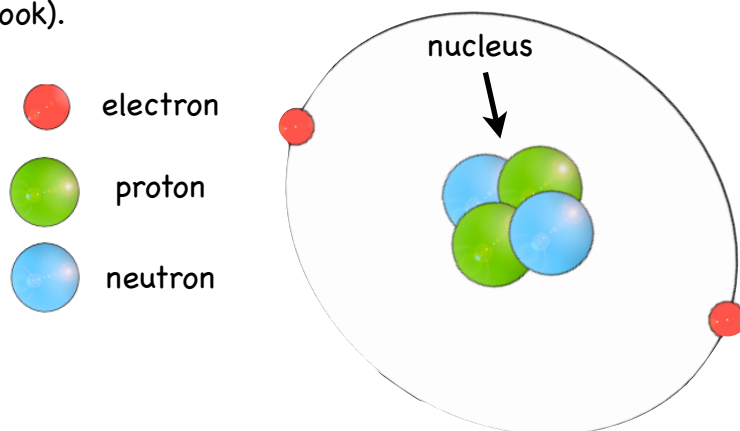
5-The atomic mass of an atom is based on the total number of protons and neutrons.

6-Most of the mass is located in the center (nucleus) of the atom.

7-Most of an atom is empty space. If the nucleus is the thickness of a paper clip wire, then the electron cloud is 100 yards across with the nucleus in the middle.

8-As energy is put into the atom it causes the electrons to move further away from the nucleus into higher energy levels. This isn't the most stable place for an electron to be, so it usually drops back down to a lower level and as it does so, it gives off the energy it acquired as a photon of electromagnetic energy.

9-These higher energy levels can hold increasing numbers of electrons (see table on page 274 of textbook).



Basic Structure of Atom

Not drawn to scale