

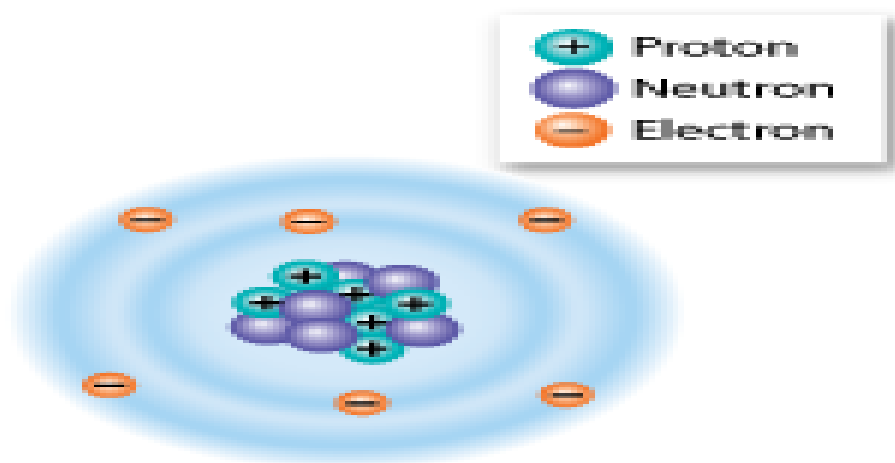
THE CHEMISTRY OF LIFE

SECTION 2.1: Atoms, Compounds & Bonds

ATOMS: the basic unit of matter!

>Structure.... Atoms are made from protons, neutrons and electrons.

Protons & Neutrons are tightly arranged to form the nucleus of the atom
Electrons are in constant motion, never stopping and orbit around the nucleus.



In an atom the # of protons and electrons are the same, therefore the net charge is zero, or no charge.

ATOMS HAVE NO CHARGE!

DON'T MESS THIS UP:

- Atomic Number..... is simply the number of protons
- Atomic Mass..... Is the number of protons AND neutrons
- Atomic Symbol..... The one or two letter designation given to each element. (The first letter is always capitalized).

molybdenum	← element name
42	← atomic number number of protons (Z)
Mo	← atomic symbol
95.94	← atomic mass A (this is an average mass)

6	← ATOMIC NUMBER - number of electrons - number of protons
C	← SYMBOL/NAME
12.01	← ATOMIC MASS - in AMU (atomic mass units)

ISOTOPES: Almost the same, but different!!

An isotope occurs when an element has a different number of neutrons.

Let's take a look at Carbon:

Isotopes of Carbon:

Isotopes of Carbon			
Isotope	Number of Protons	Number of Electrons	Number of Neutrons
Carbon-12 (nonradioactive)	6	6	6
Carbon-13 (nonradioactive)	6	6	7
Carbon-14 (radioactive)	6	6	8

QUICK REVIEW:

1. Changing the number of neutrons in an element forms????
2. Changing the number of electrons in an element forms???
3. Changing the number of protons in an element forms???

CHEMICAL COMPOUNDS

>A compound is a substance formed from two or more elements bonded together in a definite proportion. (Pure elements are rarely found on earth, most form some type of a compound to be more stable).

EXAMPLES: Water H_2O

Carbon Dioxide CO_2

Sodium Chloride $NaCl$

Glucose $C_6H_{12}O_6$

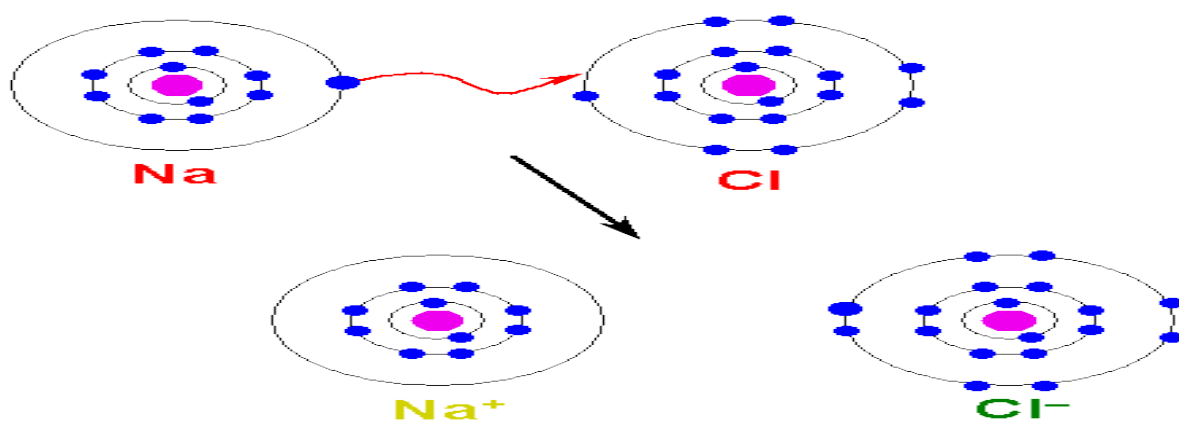
CHEMICAL BONDS

- A chemical bond is a force or attraction that holds elements together to form compounds. Electrons that are present around each atom allow for bonds to form.

2 main types of bonds:

- ✓ IONIC
- ✓ COVALENT

1. **Ionic Bonds**. "Transfer of electrons". One or more electrons may be transferred from one atom to another. This results in one atom with not enough electrons and one atom with too many electrons.



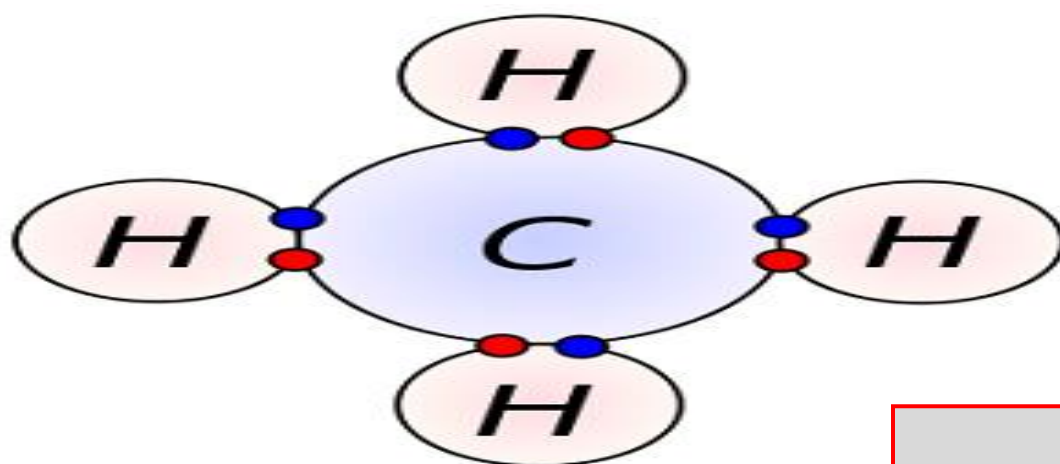
The atom that loses its electron(s) loses a negative charge. This results in a more positive atom. The atom is now said to be positively charged.

The atom that gains an electron(s) gains a negative charge. This results in a more negative atom. The atom is now said to be negatively charged.

These atoms that are "charged" are now called **IONS**.

Furthermore ions have a strong attraction for one another and will bond together forming an ionic bond.

2. **Covalent Bonds**. "Sharing of electrons". Atoms are attracted together and one or more of the outer most electrons is shared between the two atoms. This type of bond creates a molecule. This newly formed molecule does not become charged, instead it remains neutral



● Electron from hydrogen
● Electron from carbon

Methane. Each Hydrogen shares its one electron with Carbon. Carbon shares each one of its four electrons with each Hydrogen.

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[Mr. D does Atomic Structure :\)](#)



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