

## Chapter 2 Chemistry of Life

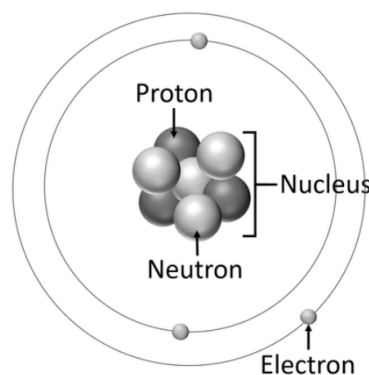
### I. Atoms, Ions and Molecules

#### A. The Atom

1. The basic unit of matter
2. the smallest part of an element

#### B. Atomic Structure

1. nucleus: the center of the atom  
contains protons and neutrons
2. energy levels (electron cloud): surrounds nucleus  
holds the electrons



#### C. Subatomic particles

1. proton: positive charge, determines atomic number, found in the nucleus
2. neutron: no charge, determines atomic mass (with protons), determines isotopes, in nucleus
3. electron: negative charge, found outside nucleus (energy levels), determines chemical (bonding) properties of the atom.

#### D. Atomic Number and (Atomic) Mass Number

1. Atomic Number: the number of PROTONS in the nucleus  
the identification of the atom
2. Atomic Mass Number: total mass of the atom  
protons + neutrons

#### E. Chemical Elements

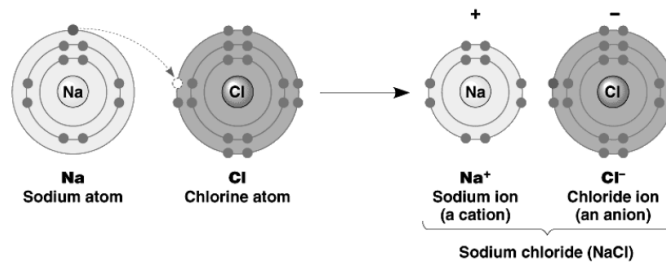
1. elements: pure substances that cannot be broken down into simpler substances
  - a. made up of only one type of atom
  - b. periodic table of elements: 92 naturally occurring
  - c. elements are uncharged (electrically neutral,  $p^+ = e^-$ )
  - d. Chemical Symbol: shorthand way to write an element name

## Chemical Compounds

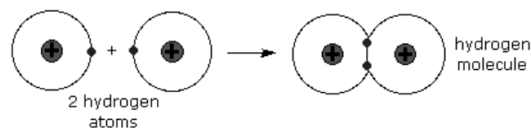
- when two or more elements/atoms join chemically to produce a new substance. (chemical reactions)
- chemical formula: shorthand way to write the name of a compound  
ex.  $H_2O$ ,  $CH_4$ ,  $CO_2$ ,  $CO$   
shows # and type of atoms in the compound
- structural formula: shows how atoms in compound are connected  
ex.  $H-O-H$ ,  $O=C=O$

## B. Types of Chemical Bonds

- Ionic Bonds:** chemical bonds that form from a transfer of  $e^-$ 's from one atom to another, a bond between ions.
  - ions: charged atoms that form when an atom gains or loses  $e^-$ 's
    - cation: positive
    - anion: negative
  - opposite charges attract (Ionic Bond)



- Covalent Bonds:** a chemical bond formed by the sharing of valence  $e^-$ 's between atoms in order to fill their valence level
  - covalent bonds can be single, double or triple.
  - single bonds: atoms will share one pair of electrons



- double bonds: atoms will share two pairs of electrons

