

## ATOMIC STRUCTURE

(ch 3)- notes

ATOM - the smallest particle of an element that retains the properties of that element

ATOMIC THEORY - discovered by John Dalton

4 ideas in this theory include:

1. All elements are composed of **submicroscopic indivisible particles** called atoms.
2. Atoms of the same element are identical. The atoms of any one element are different from those of any other element.
3. Atoms of different elements can combine with one another in simple whole number ratios to form compounds. (nomenclature)
4. Chemical reactions occur when atoms are separated, joined, or rearranged. (Law of Conservation of Mass)

ALL ATOMS ARE MADE UP OF MOSTLY EMPTY SPACE.

Atoms have three types of subatomic particles:

1. Protons ( $p^+$ ) - positively charged subatomic particles discovered by Goldstein.
2. Electrons ( $e^-$ ) - negatively charged subatomic particles; discovered by JJ Thomson through his experiments with the cathode ray tube (CRT).
3. Neutrons ( $n^0$ ) - They have no charge and were discovered by James Chadwick (apprentice of Thomson).  
Their mass almost equals the mass of a proton. (refer to p.

Cathode Ray Tube (CRT) - Electrons travel as a light ray from the cathode to the anode ends of the tube. (p.70)

Ernest Rutherford - discovered the nucleus. (p.72)

Nucleus - composed of protons and neutrons in an atom

Electrons occupy the most volume outside the dense nucleus.

Atomic Number - number of protons in the nucleus of the atom of that element

**# of protons = # of electrons = atomic number**

Atomic Mass Unit (amu) - 1/12 the mass of a carbon atom that contains six protons and six neutrons. The universal standard by which we measure other masses of elements is carbon.

Mass Number (rounded atomic mass)- Total number of protons and neutrons in the nucleus.

**# of protons + # of neutrons = mass # (the whole number)**

Isotopes - atoms that have the SAME number of protons, but different number of neutrons

The number of neutrons in an atom doesn't affect its chemical behavior, but it does affect the atom's mass. Most elements occur as two or more isotopes in nature.

Atomic Mass (atomic weight) - weighted average of the masses of the isotopes of that element

