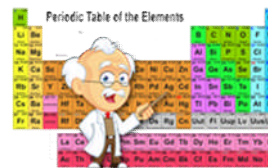


Name: _____ Date: _____
Chemistry

Class Notes

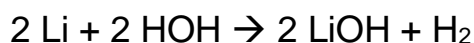
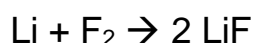
Chemical Families



The periodic table can be divided into metals, semi-metals and nonmetals. It can be divided into the representative elements which are the “s” and “p” blocks; or the transition metals which is the “d” block; or the inner transition metals which is the “f” block. But one of the most important concepts, you can glean from the periodic table is the concept of chemical families. Knowing the chemical families will help you with formulas, nomenclature and understanding chemical reactions.

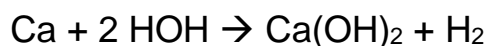
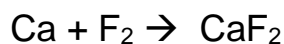
Alkali Metals (IA)

The alkali metals have one valence electron, lose one electron to form a cation (1+), form one bond, have low ionization energy and a low electronegativity. Alkali metals are very soft and can be cut with a knife; they have low melting points and low densities. Alkali metals react with nonmetals to form ionic compounds, with halogens to create salts and are extremely reactive in water.



Alkaline Earth Metals (IIA)

The alkaline earth metals have two valence electrons, lose two electrons to form a cation (2+), form two bonds, have low ionization energy and low electronegativity. Alkaline earth metals react with nonmetals to form ionic compounds, with halogens to create salts and are extremely reactive in water.



Boron Family (IIIA)

The boron family is composed of all metals except for boron which is a semimetal. Each of these elements has three valence electrons, loses three electrons to form a cation (3+), forms three bonds, has low ionization energy and low electronegativity.

Carbon Family (IVA)

The carbon family is composed of metals (Sn, Pb), semimetals (Si, Ge) and a nonmetal (C). The carbon family has four valence electrons and forms four bonds. The oxidation numbers differ depending on the element. Carbon is a 4-; Silicon is a 4+; Germanium, Tin and Lead are 4+ or 2+. The carbon family is fairly unreactive and tends to form covalent compounds except for tin and lead which form ionic compounds.

Pnictogens (VA)

The pnictogens are composed of nonmetals (N, P), semimetals (As, Sb), and one metal (Bi). The pnictogens family have five valence electrons and tend to form five bonds. Nitrogen, phosphorus and arsenic can gain three electrons to form anions (3-) and ionic compounds, but more often form covalent compounds. Antimony and bismuth can lose either three or five electrons to form cations (3+, 5+) and ionic compounds. Nitrogen has a high electronegativity that decreases as you go down the column

Chalcogens

The chalcogens consist of nonmetals (O, S, Se), semimetals (Te, Po) and one radioactive super heavy metal (Lv). The members of this family have six valence electrons; they tend to gain two electrons, form anions (2-) and have 2 bonds. The chalcogens have relatively high electronegativity and high ionization energies.

Halogens

The halogens are known as the “salt formers” and react with the alkali and alkaline earth metals readily. The halogens are very reactive and are not found as elements in nature. The halogens consist of five nonmetals (F, Cl, Br, I, At). The members of this family have 7 valence electrons, they tend to gain one electron to form anions (1-) and have one bond.

Noble Gases

The noble gases have a completed outer shell and are not looking to obtain or lose any electrons and except for a few rare cases, noble do not react with other elements. Because of this, the noble gases have no charge, no bonds, zero electronegativity, and high ionization energies.

***"It's what you learn after you know it all that counts."
- John Wooden***