Summary of the first three lectures

1st Lecture

1. Lots of registration stuff. Prof. Herrmann hates dealing with registration stuff!!!

2. Brief introduction to the periodic table.
   Groups are vertical columns – elements in groups have similar properties.
   Periods are horizontal rows.

2nd Lecture – mostly chapter 2 material

1. Metals are on the left side, non-metals are on the right side of the "staircase" of the periodic table

2. Protons, neutrons (both have mass of ~ 1amu) in nucleus. Electrons in cloud around the nucleus. Protons are +1, electrons are -1

3. **Atomic number** – shown above the element on the periodic table. This is the number of protons. This defines an element. The **mass number** = protons + neutrons. One element can have many **isotopes** (different numbers of neutrons). The **atomic mass** of an element is the average mass of the different isotopes of an element.

4. Electrons exist in shells or energy levels. 2 in the first shell, 8 in the second, next 8 in the third. **Valence electrons** are those in the highest shell.

5. Elements lose or gain electrons to empty out (metals) or fill up (nonmetals) their highest shell (their valence shell). This forms ions. Elements in the same "A groups" form the same ions.

3rd Lecture – mostly chapter 3 material

1. Lewis structures use dots to show the valence electrons. Put the dots on the sides of an imaginary "box" around the element.

2. **Ionic compounds** (and ionic bonds) are formed when elements exchange electrons to form ions. Ionic compounds are always neutral; so the total "+" charge of the metal ions = the total " – " charges of the nonmetal ions.

3. Ionic compounds are written with the positive ion first and the negative ion second. Subscripts are used to show the number of each element in the formula. Charges are not shown.

4. Ionic compounds are named with the "+" ion first, and the ending of the " – " ion is changed to "ide". $CaCl_2$ is calcium chloride.

5. If the metal ion is from the transition (or representative) elements in the "B" groups from the middle of the periodic table, the charge is shown with a Roman numeral in parentheses. For example: CrO_3 is chromium (VI) oxide. You can determine the "+" charge by balancing the total "+" with the total " – " charge.

6. Nonmetals form **covalent compounds** (and covalent bonds) by sharing their valence electrons.