CHM 100
Chapter 4 Study Guide / Learning Objectives

Chapter 4 in your textbook introduces our small-scale picture of matter. We discussed early notions of the atom (Dalton's atomic theory) which explained things like the law of conservation of mass. We then introduced a more modern conception of the atom and its internal structure - containing three subatomic particles called protons, neutrons, and electrons arranged in a system that you can think of as being similar to our solar system. From there, we discussed some terminology related to the atom - atomic number, atomic weight, etc., and how to classify atoms using the periodic table. Finally, we discussed compounds (elements chemically combined) - noting that compounds are formed in more than one way. One way (sharing electrons) resulted in molecules, while the other way resulted in ions (charged particles).

At the end of Chapter 4, you should be able to...

[Terminology]
- Define terms related to the atom: atom, proton, neutron, electron, nucleus.
- Define terms related to the classification of atoms: isotope, atomic number, mass number, atomic weight
- Define terms related to the periodic table: period, group, metal, nonmetal, metalloid
- Define terms relating to compounds: chemical formula, diatomic molecule
- Define terms relating to ions: ion, cation, anion, formula unit,

[Dalton and the atom]
- List and describe Dalton's four postulates.
- Describe Dalton's definitions of atoms, elements, and compounds.

[Structure of the atom]
- Describe where protons, neutrons, and electrons are found in the atom.
- Draw a diagram of an atom.
- Explain where the mass of an atom is located.
- Explain how isotopes of the same element are different and how they are the same.
- List how many protons, neutrons, and electrons are present in a given isotope.
- Use atomic symbol notation (including mass numbers and atomic numbers).

[The periodic table]
- Locate an element in the periodic table given any of the following: element name, element symbol, atomic number, or group/period.
- Determine, given an element, whether the element is metallic, nonmetallic, or a metalloid.
- Describe how chemical properties and groups on the periodic table are related.
- List the common properties of metals, nonmetals, and metalloids.

[Compounds]

- Given the number of atoms of each element present, write a chemical formula.
- List the common elements that form diatomic molecules.

[Ions]

- Determine whether a compound is molecular or ionic, given the elements it contains.
- Determine what kind of ions form when atoms gain or lose electrons.
- Describe how the structure of an ionic solid is different from the structure of a molecule.
- Explain how a solution containing an ionic substance can conduct electricity, while plain water does not conduct electricity.

[Practice]

- (p 107-113) Q&P: 8, 10, 16, 18, 20, 22, 24, 30, 34, 36, 38, 42, 44, 46, 48, 58, 66, 72, 74, 76, 80, 84