

CHM 100
Chapter 11 Study Guide / Learning Objectives

Chapter 11 discusses the the structure of the electron cloud of an atom and the effects of this structure on atomic properties and how the electron clouds of atoms interact to form chemical bonds.

At the end of chapter 11, you should be able to

[Early models of the electron cloud]

- Define **atomic line spectrum**, **energy level**, **transition**.
- Explain how Bohr's model of the atom agrees with the fact that each element emits only certain colors of light when excited in the gas state.

[Orbitals, shells, and subshells]

- Define **orbital**, **shell**, **subshell**. (Your textbook refers to shells as "levels" and subshells as "sublevels". Most chemists, though, use "shell" and "subshell".)
- Describe how **shells** are related to Bohr's energy levels.
- Describe how the **number** of a shell relates to its **distance** from the nucleus of an atom.
- Tell which **subshells** exist in a given energy level.
- Tell how many **orbitals** are present in a given subshell.

[Electron configurations]

- Define **electron configuration**, **valence electron**, **Pauli exclusion principle**.
- Determine how many **electrons** are in an atom based on its electron configuration.
- Label the **s-block**, **p-block**, **d-block**, and **f-block** elements, given the periodic table.
- **Write** the electron configuration of any of the first 18 elements (H to Ar) using a periodic table.
- Determine the **valence (outer) electrons** of **any** main-group element on the periodic table.

[Periodic trends]

- Define **atomic radius**, **ionization energy**.
- Describe how the atomic radius changes as you move across and down the periodic table.
- Describe how the first ionization energy changes as you move across and down the periodic table.
- Predict which of two elements has a larger atomic radius.
- Predict which of two elements has a larger ionization energy.

[Practice]

- (p352-357) Q&P 2, 16, 20, 22, 24, 26, 32, 36, 40, 44, 48, 50, 56, 60, 62, 80, 82