Chapter 7 Electron Structure of the Atom
Learning Objectives

Introduction
• Describe the different types of light that you see in your environment.

7.1 Electromagnetic Radiation and Energy
• Describe properties of light (electromagnetic radiation) including wavelength, frequency, and energy.
• Put types of visible light in order of increasing wavelength, frequency, or energy.
• Explain relationships among wavelength, frequency, energy, Plank’s constant, and the speed of light.
• Determine quantities (energy, frequency, and wavelengths) for various forms of electromagnetic radiation using appropriate units.
• Distinguish between continuous and line (emission) spectra.

7.2 The Bohr Model of the Hydrogen Atom
• Describe the behavior of an electron in a hydrogen atom
• Explain the significance of quantization of energy.
• Explain the role of atomic spectra in the development of the modern model of the atom.
• Explain the origin of the four lines that appear in the visible spectrum for hydrogen.

7.3 The Modern Model of the Atom
• Describe the ground state distribution of electrons in an atom in terms of orbitals, sublevels, and principle energy levels using appropriate rules/principles.
• Write the notation for the complete electronic configuration of any atom.

7.4 Periodicity of Electron Configurations
• Describe how the arrangement of electrons in atoms relates to the arrangement of elements in the periodic table.
• Write the notation for the abbreviated electronic configuration of any atom.

7.5 Valence Electrons for the Main-Group Elements
• Identify the chemically important electrons in an atom.
• Distinguish between core and valence electrons in an atom.
• Determine the number of valence electrons in an atom of a main-group element.

7.6 Electron Configurations for Ions
• Describe how the electron arrangements in ions differ from the electron arrangements in atoms.
• Identify atoms and ions that are isoelectronic.
• Write the notation for the complete or abbreviated electronic configuration of any monatomic ion.

7.7 Periodic Properties of Atoms
• Explain how properties of atoms are related to their electron arrangements.
• Describe and explain periodic trends in atomic radius.
• Describe and explain periodic trends in sizes of ions.