

# Chapter 8—The Periodic Table

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After this chapter, you should be able to...

- Explain how the periodic table is currently arranged
  - Explain Moseley contribution to the periodic table (PT)
- Identify the names given to the vertical columns and horizontal rows on the PT
- Explain why elements in the same group have similar chemical properties (in terms of their electron configurations)
  - Explain what is meant by the core- and valence-electrons
  - Explain which electrons are used to form chemical bonds
- Write the electron configurations of any main-group ion
  - Write the electron configuration of any transition-metal ion of specified charge
- Define isoelectronic, and recognize when two atoms/ions are isoelectronic to one another
- Explain what is meant by: nuclear charge, effective nuclear charge, and shielding
  - Explain the trend in atomic radius moving across and down the periodic table
  - Explain the trend in ionic radius moving across and down the periodic table
- Write an equation corresponding to the  $n^{\text{th}}$  ionization energy,  $I_n$  of a particular element
  - Explain why sudden jumps in the values of  $I$  are consistent with the electrons being in shells and subshells
    - Account for the 'blips' in the ionization energy of elements in the 2<sup>nd</sup> and 3<sup>rd</sup> period
- Write an equation corresponding to the 1<sup>st</sup> electron affinity (EA) of an element
  - Explain qualitatively the meaning of a positive or negative electron affinity (in terms of anion stability)

Make sure you can solve all the end-of-chapter homework problems!