Pearson

3.9: Periodic Trends Summary

In this chapter, we have examined various trends in properties that we can understand in terms of electron configurations. Since electron configurations are just a way of specifying electronic structure, the trends in this chapter are a good example of the overall theme of this book: *structure determines properties*. In other words, we have just seen how electronic structure determines the size, ionization energy, electron affinity, and metallic character of atoms. We summarize these four important properties and their periodic trends in Table 3.2.

Table 3.2 Summary of Periodic Properties

Property	Trend Moving Down a Column	Reason for Trend	Trend Moving Across a Row	Reason for Trend
Atomic Radii	Increasing ↑	Size of outermost occupied orbital increases ↑	Decreasing ↓	Effective nuclear charge increases ↑
First Ionization Energy	Decreasing ↓	Outermost electrons are further away from nucleus (and therefore easier to remove)	Increasing ↑	Effective nuclear charge increases ↑
Electron Affinity	No definite trend		Decreasing (more negative) ↓	Effective nuclear charge increases ↑
Metallic Character	Increasing ↑	Ionization energy decreases ↓	Decreasing ↓	Ionization energy increases ↑