

Chapter 8 Chemical Bonding

Learning Objectives

8.1 Types of Bonds

- Differentiate between ionic and covalent bonding, and classify the bonding in a compound as ionic or covalent.
- Differentiate between polar and nonpolar covalent bonding.
- Describe the significance of relative electronegativity in bonding.
- Identify each atom in a polar bond as having a partial negative charge or a partial positive charge.
- Compare the relative polarity of two or more polar bonds.

8.2 Ionic Bonding

- Describe the nature of the bonding in ionic compounds.
- Draw Lewis symbols for atoms and monatomic ions in ionic compounds.

8.3 Covalent Bonding

- Describe the nature of the bonding in molecular compounds.
- Describe the importance of the octet rule.
- From its Lewis symbol, predict the number of covalent bonds an element typically forms.
- Draw Lewis formulas for the diatomic elements, molecular compounds, and polyatomic ions.
- Describe the number of shared and unshared electrons in a Lewis formula.
- Determine if a molecule or polyatomic ion exhibits resonance and draw the resonance structures.

8.4 Shapes of Molecules

- Describe how the shapes of molecules and polyatomic ions are determined.
- Use the valence-shell electron-pair repulsion (VSEPR) theory to predict the parent structure, approximate bond angles, and molecular shape of a molecule or polyatomic ion.
- Determine whether a molecule or polyatomic ion is polar or nonpolar.