

CHAPTER OVERVIEW

7: Further Aspects of Covalent Bonding

In the following sections, we will develop a more detailed picture of molecules—including some which do not obey the octet rule. You will learn how both the shapes and bonding of molecules may be described in terms of orbitals. In addition it will become apparent that the distinction between covalent and ionic bonding is not so sharp as it may have seemed. You will find that many covalent molecules are electrically unbalanced, causing their properties to tend toward those of ion pairs. Rules will be developed so that you can predict which combinations of atoms will exhibit this kind of behavior.

Topic hierarchy

- 7.1: Prelude to Covalent Bonding
- 7.2: Exceptions to the Octet Rule
 - 7.2.1: Biology- Biologically Active Exceptions to the Octet Rule
- 7.3: The Shapes of Molecules
 - 7.3.1: Lecture Demonstrations
- 7.4: Molecules with Lone Pairs
 - 7.4.1: Lecture Demonstrations
- 7.5: Multiple Bonds and Molecular Shapes
- 7.6: Hybrid Orbitals
- 7.7: Orbital Descriptions of Multiple Bonds
- 7.8: Sigma and Pi Bonds
- 7.9: Polarizability
 - 7.9.1: Biology - Polarizability of Biologically Significant Atoms
- 7.10: Polar Covalent Bonds
 - 7.10.1: Biology- Nonpolar Iodine and Polar Hydrogen Iodide
 - 7.10.2: Lecture Demonstrations
- 7.11: Electronegativity
- 7.12: Polarity in Polyatomic Molecules
 - 7.12.1: Biology- The Hydrophobic Effect and Properties of Small Polyatomic Molecules
 - 7.12.2: Lecture Demonstrations
- 7.13: Formal Charge and Oxidation Numbers
- 7.14: Resonance

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