

Molecular Shape and Structure

Focus 2E-F

Problems 2E: 1, 3, 5, 7, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29; 2F: 1, 3, 5, 7, 9, 13, 15, 17; and 2.27, 2.45, 2.57, 2.59, 2.61, 2.63

After going through the readings & problems and attending the lectures & discussion groups, you should be able to:

- Use the Valence-Shell Electron-Pair Repulsion Model (VSEPR) to determine the shape of inorganic, organic, and small biological molecules, cations, and anions.
- Use bond dipole moments and shape to determine if a molecule is polar or non-polar.
- Use shape and polar or non-polar properties, identify different intermolecular interactions/forces (H-bonding, dipole-dipole, dispersion).
- Explain why lone pairs are more likely to be found in certain locations around a central atom and how and why they affect the bond angles in a molecule, cation, or anion.
- Distinguish sigma and pi bonds by their shapes, properties, and component orbitals.
- Explain how hybridization arises from atomic orbitals.
- Know the types of hybridization (sp , sp^2 , sp^3 , sp^3d , sp^3d^2) and apply this bonding model to inorganic, organic, and biological compounds (molecules, cations, and anions).
- Describe the structure of a molecule, cation, or anion in terms of hybrid orbitals and sigma and pi bonds.