Course Objectives for CH 1010
Fall 2016

Chapter 5: Bonding Theories

Big Ideas

- The shapes of molecules/ions can be predicted.
- Bonding can be described by using different models – each is useful and each has drawbacks.

After your study of this chapter you should be able to:

1. Use VSEPR model to describe the electron pair geometry of molecules and polyatomic ions using regions of electron density (electron domains).
2. Use electron pair geometry to predict the shape (as outlined by the atoms) and bond angle in a molecule or a polyatomic ion.
3. Based on the shape of a molecule or polyatomic ion predict the angle of a given bond.
4. Account for distortions in bond angles from lone pair(s).
5. Assign the appropriate atom hybridization based on electron geometry.
6. Identify the orbitals that overlap to give a specific bond in a molecule or polyatomic ion, according to Valence Bond Theory (VBT).
7. Describe the differences between sigma and pi bonds.
8. Use Molecular Orbital (MO) theory to explain bonding and anti-bonding orbitals, multiple bonds, sigma and pi bonds.
9. Combine the concepts of VBT and MO theory to explain resonance hybrids and the delocalization of electrons.