Matter and Motion Fall 2015

Molecular Models Workshop

For each the following molecules and ions - 1) Draw the Lewis structure. 2) How many electron groups are around the center atom? 3) How many bonding groups are around the center atom? 4) How many lone pairs are on the central atom? 5) What is the AXE class? 6) What is the electron geometry around the central atom? 7) What is the molecular shape? 8) What is the polarity of the bonds? 9) Is the molecule polar or nonpolar? 10) What are the bond angles? 11) Use the model kit to make a 3-D model 12) Sketch a drawing of the model.

A) BF_3
B) CH_4
C) NH_3
D) H_2O
E) NH_4^+
F) CO_2
G) CO_3^{2-}
H) SO_2
I) CH_3F
J) CH_2F_2
K) CF_4
L) C_2H_4
M) C_2H_6

13) Consider the molecules H_2O, CO_2, and SO_2. Look up the values for the melting point and boiling point of these compounds. Discuss in your group how the differences in polarity and molecular shape and account for the different boiling and melting points.

14) Compare the molecular models of C_2H_4 (ethene) and C_2H_6 (ethane). What is the hybridization around the carbon atoms in each molecule? Can you rotate the carbon atoms with respect to each other? Use your knowledge of hybridized bonding orbitals to explain your observations. Discuss in your group which molecule you would expect to be more reactive.