Chem 4A Scolars Worksheet 11

MO Diagrams and VSEPR Revisited

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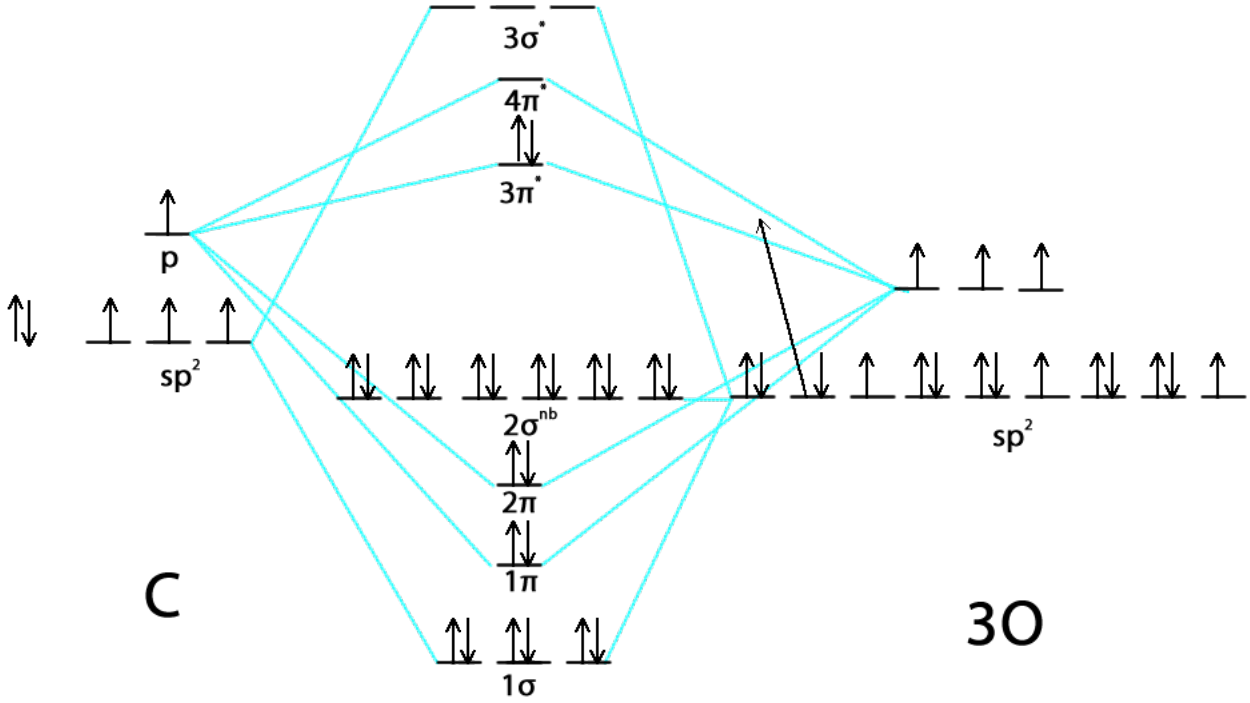
October 8, 2013

Questions:

1. Draw the lewis structure for CO_3^{2-}.

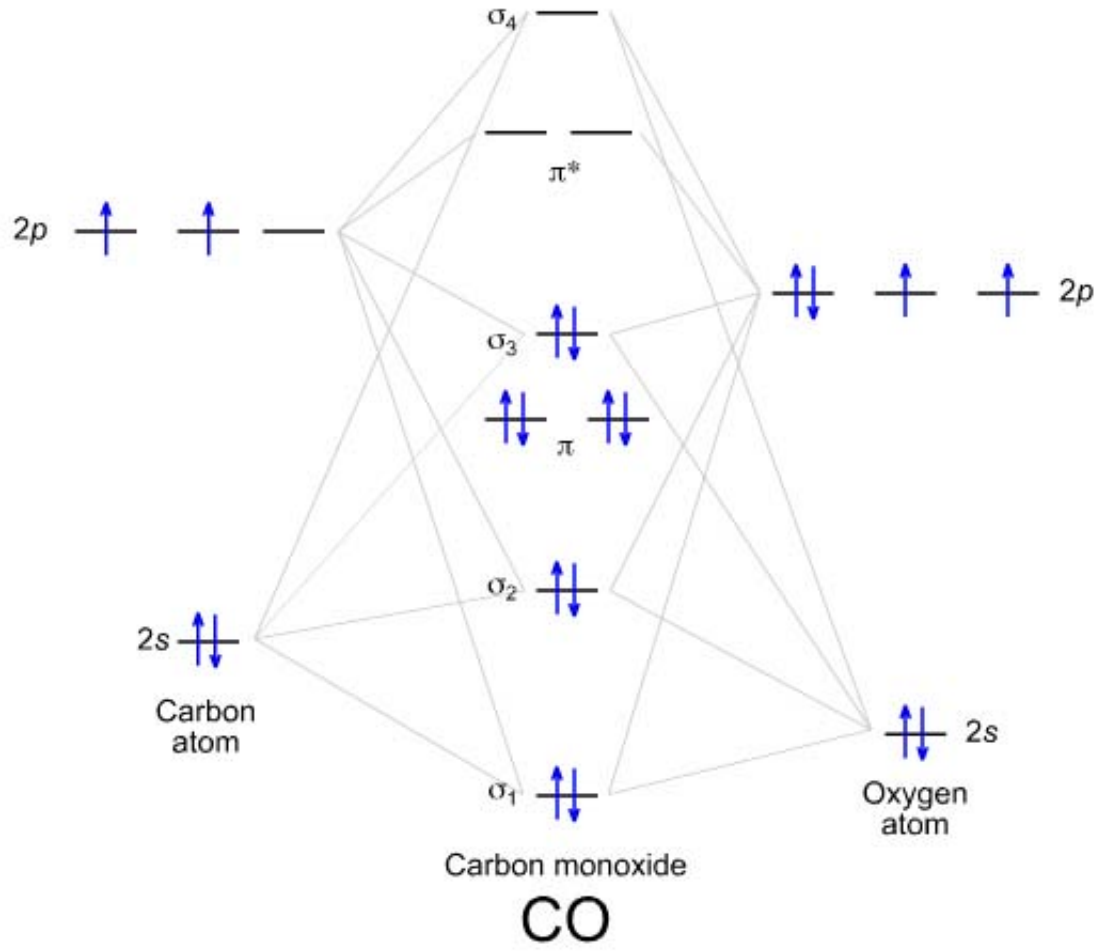
Draw the MO diagram for CO_3^{2-}.



Is CO_3^{2-} paramagnetic or diamagnetic?

Diamagnetic

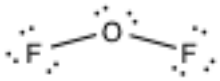
2. Draw the molecular interaction diagram for CO, determine it's bond order, and it's magnetism.



It's diagmagetic, bond order is 3. What about CO^+ and CO^-? And which one is more stable among the three?

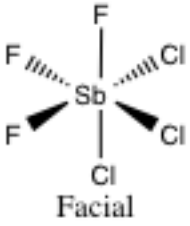
Both have 2.5 bond order, and are paramagnetic.

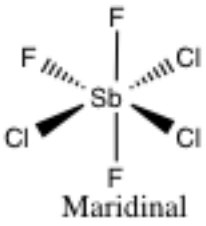
3. Draw the Lewis structure for OF_2, determine the SN, and determine its molecular geometry.



SN=2, it is bent.

Draw the Lewis structure and molecular geometries $SbCl_3F_3^-$





You may notice that the above ion has two possible molecular geometries, which one is more stable, and why?

Maridinal is more stable because it gives larger angle between Cls. Because Cl is less electronegative than F, the electrons in Sb-Cl bond is closer to Sb, thus takes up more space.

Rank the the following angles from lowest to highest:
∠HOH, 109.5°, ∠FOF, 90°, ∠FSbF, ∠ClSbCl, ∠HCH in C_2H_4

∠FSbF < 90°< ∠ClSbCl < ∠FOF < ∠HOH < 109.5°< ∠HCH in C_2H_4