Chem 370 - Spring, 2019
Assignment 8

Reading Assignment

Complete reading Chapter10 and begin reading Chapter11, if you have not already done so. As noted previously, I will not discuss the angular overlap method (section 10.4), but we will talk about many of the topics in this section from a different perspective.

Test 2

As you will note from the course calendar, Test 2 will consist of two parts, given in the morning and afternoon meeting times on Monday, April 22nd. It will cover all the lecture material corresponding to the assigned sections in Chapters 5, 6, and 7, and the lecture material covering Chapter 10. We may postpone inclusion of topics in Chapter 11 to the third test, depending on how we progress through the material. Use the class overheads, your notes, and especially the homework assignments for preparation. Also, look at the posted tests from last year.

Part 1 will have a mixture of short answer or multiple choice problems, covering all of the material since the last test. Be sure you know the homonuclear diatomic MO scheme, and MO arguments like those we covered that are related to acid-base chemistry. Know the acid-base theories we covered, and be prepared to answer questions similar to the homework problems. Know the principles of crystal chemistry that we covered, and be prepared to answer questions similar to the homework problems on this material. Know the principals of crystal field theory and transition-metal MO theory.

Part 2 may start with one or two short essay questions on the covered material (unless I move this to the first part as I am writing the test). I usually give several essay questions, from which you can choose the two you wish to answer. The rest of Part 2 will be devoted to a group theory problem dealing with MO theory and/or hybrid orbitals. I will not ask you to develop a full MO scheme from scratch. However, you may be asked to use group theory to determine symmetries of central atom AOs and pendant atom SALCs, and from that information determine what bonding/antibonding or nonbonding MOs can be formed. You might be asked to sketch some of these combinations. In the past, I have given a skeleton MO scheme and asked students to draw connecting lines between AOs, SALCs, and MOs, and to give symmetry and bond-type labels to the diagram. Be prepared to fill such a scheme with the proper numbers of electrons contributed by ligands and to indicate at what level additional electrons add to account for a metal ion's contribution. See the posted tests from last year to get a sense of the format and level you can expect for your test.

Homework Assignment

Do the following problems from the text for discussion on Friday, April 12th. The assigned problems in Chapter 10 have the same numbering in both the 4th and 5th editions.

Chapter 10: 10.1, 10.2 (LFSE = CFSE), 10.7, 10.8, 10.21, 10.23, 10.26. For both 10.26a and 10.26b, determine the relative ordering of *d* orbital energies in the CFT model before proceeding to the determination of SALC symmetries and potential combinations to form MOs. In 10.26b, do not attempt to draw the energy level diagram, but rather identify the *d* orbitals and SALCs that will form bonding and antibonding combinations, and identify any *d* orbitals or SALCs that must be nonbonding by virtue of symmetry.