Chem 1020 Fall 2005  
Ch 4 Assignment (Homework 4)  
Due Friday, Sept 30 before class

Address an email to andrew.aspaas@anokaramsey.edu (spell carefully) from your MetNet email account, and make the subject “Lastname Chem 1020 Homework 4” using your own last name (and without the quotes).

Answer the following questions in the body of the email message.


   Since energy and wavelength are inversely proportional, waves with high energy have a short wavelength, and vice-versa. If you are asked about colors of visible light, remember that purple light has a short wavelength and red light has a long wavelength - from that you can figure that purple light has higher energy than red light.

2. **What happens to an electron when it absorbs energy?** It jumps to a higher energy level, also known as an excited state. How does that electron give off that extra energy? It drops back down to a lower energy level and electromagnetic radiation is emitted. What form of electromagnetic radiation is the extra energy usually given off as? In the examples we discussed, visible light.

   The entire conceptual process of electrons becoming excited and returning to the ground state is a commonly used essay question on exams. It often helps to think of it in terms of the gas tubes that glow when electricity is applied.

3. **What is the full electron configuration for Sc?** (21 electrons)

   Sc: 1s$^2$, 2s$^2$, 2p$^6$, 3s$^2$, 3p$^6$, 4s$^2$, 3d$^1$

   Some sources (including the textbook at times) will write the valence electrons last (3d$^1$ then 4s$^2$) but I prefer you just follow the order of the periodic table.
4. What is the abbreviated electron configuration for Hg (80 electrons)

Hg: [Xe] 6s², 4f¹⁴, 5d¹⁰

Do not be confused by the periodic table in the textbook which lists La as a transition metal, after which you jump to the 4f section. Although many periodic tables are still written this way, it is becoming more popular to include La down in the 4f section, so it’s immediately skipped to after the 6s elements. Use the periodic table I provided you for practice on this, as that’s what you’ll have on the exam.

5. What is the formula for an ionic compound made of potassium and oxygen? Magnesium and sulfur?

K loses 1 electron to become K⁺ and O gains 2 electrons to become O²⁻. Crossing the numbers over and down gives K₂O.

Mg loses 2 e⁻ to become Mg²⁺ and S gains 2 to become S²⁻. The + and – charges are already balanced so the formula is simply MgS. Alternatively you could have crossed the 2’s to get Mg₂S₂ and then simplify it to MgS.