Chemistry 141 Name

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Take-home Quiz 8 (40 points) Halloween, 2007

1. (10 points) Calculate the overall energy changes (in kJ/mol) for the formation of MgF and MgF2 from their elements. The lattice energy for MgF2 is + 2952 kJ/mol. The estimated value of the lattice energy for MgF is + 930 kJ/mol. Other thermodynamic data should be available from your book or on the web.
2. (5 points) In light of your answers to problem 1, which compound is more likely to form in the reaction of magnesium with fluorine, MgF or MgF2? Explain your reasoning.
3. (5 points) Do ionization energies have a positive or negative value? Explain
4. (5 points) To melt an ionic solid, energy must be supplied to disrupt the forces between ions so the regular array of ions collapses. If the distance between the anion and cation in a crystalline solid decreases (but ion charges remain the same), should the melting point increase or decrease? Explain your reasoning.
5. (5 points) Write the electron configuration of the atom in the third row of the periodic table that has the largest difference between the third and fourth ionization energies.
6. (5 points) Cesium has the smallest ionization energy of all the elements (376 kJ/mol), and chlorine has the most negative electron affinity (-349 kJ/mol). Will a cesium atom donate an electron to a chlorine atom to form isolated Cs+ and Cl- ions? Explain your logic.
7. (5 points) The lattice energies of FeCl3, FeCl2, and Fe2O3 are (in no particular order) -2631, -5359, and -14,774 kJ/mole. Match the appropriate formula to each lattice energy. Explain your reasoning.