Assignment #7 – Atomic Structure Exercises

Due: Monday March 20, 2006

1. Exercises #8-12 from ChemActivity 8 – The Hydrogen Atom (II) (p. 74).

2. Exercises #1, 4, 5 from ChemActivity 9 – Multielectron Atoms (p. 81, 88).


4. First ionization energies of atoms are approximately equal to the negative of the energies of the highest filled orbital. Below is a chart of 1st ionization energies for H-Xe. (The vertical axis is energy in kJ/mol.) Loosely speaking these energies can be interpreted as reflecting effective nuclear charges via

\[ E(Z_{\text{eff}}, n) / E_k \approx -\frac{1}{2} \left( \frac{Z_{\text{eff}}}{n} \right)^2 \]

Discuss these data in terms of the effective nuclear charges and screening of valence electrons as one traverses the periodic table.

Figure from Brown, LeMay, & Butsten, *Chemistry the Central Science*, 7th ed. (Prentice-Hall, 1997)