LECTURE 9

1. (a) Which atom or ion in each of the following pairs has the larger radius?
   (i) V or Mo (ii) V or Zn (iii) Ca or Ca^{2+}
   (b) Briefly explain the relationship between effective nuclear charge and atomic radius.

2. Consider the KF molecule, which has an ionic bond. The bond length is 2.17×10^{-10} m.
   (a) Calculate the energy required to dissociate the KF molecule into the ions K^+ and F^-.
   (b) The energy required to dissociate KF into neutral atoms is 498 kJ/mol. Given that the first ionization energy for K is 418 kJ/mol, calculate the electron affinity (in kJ/mol) for F. Show your work for all calculations.

3. Draw an energy diagram (with energy on the y-axis and internuclear distance, r, on the x-axis) plotting a C–F and a C–I bond. You should include numbers on the y-axis. No numbers are needed on the x-axis, but relative distances should be correct. Bond dissociation energies are 238 kJ/mol and 484 kJ/mol for C-I and C-F respectively.

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