Chemistry 2C, Spring 2015, Assignment 1:

Posted: 4/14/2015
Due: 4/21/2015

All questions from the 6th edition of Atkins, Jones, and Laverman, unless otherwise noted.

1. The attractive energy Coulombic energy E_p *per* mole in a crystal with cations and anions of the same charge $|z|$ is:

$$E_p = -A \times (N_A z^2 e^2)/(4\pi\varepsilon_o d)$$

where d is the separation between closest cation-anion pars (the "bond" distance). Answer the following questions:

(i) Why is it that atoms with smaller atomic numbers usually release more energy when they form an ionic crystal?
(ii) Which term hints at why NaCl would dissolve in water.
(iii) In general terms, what is the role that the charge z plays?
(iv) The equation above is attractive, and suggests that the ions will fall into each other (*ie*. $d \rightarrow 0$). What prevents this in a real crystal?

Questions 3.32, 3.34, 3.36, 3.38, 3.40, 4.42, 3.44, 3.46, 3.48

Questions 3.50, 3.52, 3.54, 3.62, 3.66, 3.70, 3.74, 3.76, 3.82, 3.86, 3.88

Please return the homework in class or to Ram's office (MRL 3008) as a hardcopy.