PHYS 321 P 2.15 Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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P 2.15: For a K+-Cl- ion pair, attractive and repulsive energies *EA* and *ER*, respectively, depend on the distance between the ions *r*, according to

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| http://edugen.wileyplus.com/edugen/courses/crs4676/common/art/pixel.gif |
| http://edugen.wileyplus.com/edugen/courses/crs4676/callister9977/callister9977c02/math/math025.gif |  |
| http://edugen.wileyplus.com/edugen/courses/crs4676/common/art/pixel.gif |

For these expressions, energies are expressed in electron volts per K+-Cl- pair, and *r* is the distance in nanometers. The net energy *EN* is just the sum of the preceding two expressions.

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| http://edugen.wileyplus.com/edugen/courses/crs4676/common/art/pixel.gif | |  |  | | --- | --- | | (a) | Superimpose on a single plot *EN*, *ER*, and *EA* versus *r* up to 1.0 nm  (Use Excel). | | http://edugen.wileyplus.com/edugen/courses/crs4676/common/art/pixel.gif | | | (b) | On the basis of this plot, determine (i) the equilibrium spacing *r*0 between the K+ and Cl- ions, and (ii) the magnitude of the bonding energy *E*0 between the two ions. | | http://edugen.wileyplus.com/edugen/courses/crs4676/common/art/pixel.gif | | | (c) | Mathematically determine the *r*0 and *E*0 values using the solutions to Problem [2.14](http://edugen.wileyplus.com/edugen/courses/crs4676/callister9977/callister9977c02/callister9977/callister9977c02/callister9977c02xlinks.xform?id=callister9977c02-prob-0017) and compare these with the graphical results from part (b). | |