Report on the Evaluation of Chapter 18 Nature of the Ionic Bond of Alkali Hydrides and Halides in "The Grand Unified Theory of Classical Physics" by Dr. Randell L. Mills

Revised
Prepared by

Randy A. Booker, Ph.D.
57 Azalea Drive
Weaverville, NC 28787
(828) 251-6269
Booker@unca.edu

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Executive Summary

In my analysis, I verified calculations and equations involving the ionic bond of alkali hydrides (namely, LiH, NaH, KH, RbH, and CsH) and alkali halides (namely, LiF, NaF, KF, RbF, CsF, LiCl, NaCl, KCl, RbCl, and CsCl), including Potassium Hydrino Hydride, found in Chapter 18 of the book "The Grand Unified Theory of Classical Physics" by Dr. Randell L. Mills. I verified equations and values to a high degree of accuracy that are associated with these molecular systems. There is a remarkable agreement between the GUTCP calculated values for the energies, distances, and parameters of these molecular systems and my calculations. I verified as correct all the equations and values found in Equations 18.1 through 18.82.

Purpose

In Chapter 18, the GUTCP book investigates the ionic molecular bond of LiH, NaH, KH, RbH, CsH, and Potassium Hydrino Hydride (KH(¼)). The lattice energy and the MH distance are found for each species (where M=Li, Na, K, Rb, and Cs). These values are compared to known experimental values, and there is remarkable agreement between the two values for each alkali hydride. Crystal structures for each of these alkali hydrides are drawn.

Next in Chapter 18, the book derives Alkali Halide Lattice Parameters and Energies. Then the radius and ionization energy of the outer electron of the Fluoride ion are calculated. A force balance equation is set up which results in values for r_{10} and the ionization energy. Then the radius and ionization energy of the outer electron of the Chloride ion are calculated. A force balance equation is set up which results in values for r_{18} and the ionization energy. Next the change in the radius and ionization energy of the Fluoride ion due to the ion field is calculated. A new force balance equation is set up which yields new values for r_{10}, the ionization energy, and $\Delta E(\text{ionization; } F^-)$. Next the change in the radius and ionization energy of the Chloride ion due to the ion field is calculated. A new force balance equation is set up which yields new values for r_{18}, the ionization energy, and $\Delta E(\text{ionization; } Cl^-)$.

This allows the calculation of the lattice energy and MF distance r_o. These values are compared to known experimental values, and there is remarkable agreement between the two values for each alkali fluoride. Crystal structures for each of these alkali fluorides are drawn. The alkali fluorides investigated are LiF, NaF, KF, RbF, and CsF.

Next is the calculation of the lattice energy and MCl distance r_o. These values are compared to known experimental values, and there is remarkable agreement between the two values for each alkali chloride. Crystal structures for each of these alkali chlorides are drawn. The alkali chlorides investigated are LiCl, NaCl, KCl, RbCl, and CsCl.

Calculation

I have verified that Equations 18.1-18.3 are true. The value for M_e for NaCl in line 2, pg. 1166, is correct, as well.

I have verified that Equations 18.4-18.8 and their values are correct.

I have verified that Equations 18.9-18.13 and their values are also correct.

I have verified that Equations 18.14-18.22 are correct.

I have also verified that Equations 18.23-18.27 and Equation 18.29 are correct. Also correct are the values found in Equations 18.28 and 18.30.

I have verified that Equations 18.32-18.39 are true.

I have verified as correct Equations 18.40, 18.42, 18.45, and 18.46. The values found in Equations 18.41 and 18.43 are correct.

I have verified that Equations 18.47 and 18.49 are correct. The values found in Equations 18.48, 18.50, and 18.51 are also correct.

I have verified that Equations 18.52, 18.55, 18.57, and 18.58 are correct as listed. The values found in Equations 18.53 and 18.59 are found to be correct.

I have verified that Equation 18.60, the values in Equations 18.61 and 18.64, and the equation and values in Equation 18.63 are correct as listed.

I have verified that Equation 18.66, and Equations 18.65 and 18.67 and their values, are correct.

I have verified as correct the values found in Equations 18.68 and 18.70. Also, the equation and values found in Equation 18.69 are correct.

I have verified as correct the values found in Equations 18.72 and 18.74. Also, the equation and values found in Equations 18.71 and 18.73 are correct.

I have verified as correct the values found in Equation 18.76. Also, the equation and values found in Equation 18.75 are correct.

I have verified as correct the equation and values found in Equation 18.77. I have likewise found the value found in Equation 18.78 correct.

I have verified as correct the equation and values found in Equation 18.79. I have likewise found the value found in Equation 18.80 correct.

I have verified as correct the equation and values found in Equation 18.81. I have likewise found the value found in Equation 18.82 correct.

Conclusion

I was able to verify that the GUTCP results of Chapter 18 are in excellent agreement with my own calculations. I successfully reproduced almost all of the equations and their corresponding values found in Chapter 18. That is, I have verified as all of the equations and the values they produce from Equation 18.1 to 18.82. This chapter demonstrates that the GUTCP theory is successful at describing the ionic bonds of LiH, NaH, KH, RbH, CsH, Potassium Hydrino Hydride, LiF, NaF, KF, RbF, CsF, LiCl, NaCl, KCl, RbCl, and CsCl to a high degree of accuracy.

I find my results and calculations to be confirmation that the calculations and equations of Chapter 18 are indeed accurate, valid, and reproducible.