Report on the Evaluation of Chapter 22 Boron Molecular Functional Groups And Molecules in "The Grand Unified Theory of Classical Physics" by Dr. Randell L. Mills

Prepared by

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Executive Summary

In my analysis, I verified calculations and equations involving Boron molecular functional groups and the molecules that are formed from them found in Chapter 22 of the book "The Grand Unified Theory of Classical Physics" by Dr. Randell L. Mills. There is a remarkable agreement between the GUTCP calculated values for the energies and parameters of these functional groups, the Boron molecules they comprise, and my calculations. I verified as correct all the equations and values found in Equations 22.1 through 22.40. I also verified all the calculated values in Tables 22.2 through 22.10 as correct. In Tables 22.35.1 through 22.35.5 at the end of the chapter, I verified that all the calculated values of Table 22.35.1 are correct, and I verified that all of the relative errors in the other tables were correct. I did not review the sections of the chapter between the Alkyl Boranes and the Summary Tables since the tables in this chapter were so extensive and took me so long to verify every entry in those long tables. Overall, there was a remarkable agreement between the calculated values based on the GUTCP theory and the corresponding experimental values.

Purpose

In Chapter 22, the GUTCP book investigates Boranes (B_xH_y). E_{Total}, $E_{coulomb}$, and $E_{magnetic}$ are calculated first. Then the force balance equation is used to find a = semimajor axis for B-H. Next, a force balance equation is used to find a=semimajor axis for B-B.

Next is a section on the bridging bonds of Boranes, namely B-H-B and B-B-B. A force balance equation is used to find a = semimajor axis for them. Also found are the polar radius r_i and the polar angle φ. A charge density picture of Diborane is shown next.

Next, a table of the geometrical bond parameters of boranes is presented. The next table shown is the MO to HO intercept geometrical bod parameters of boranes. The next table lists the energy parameters of the functional group of boranes. After that, the next table lists the total bond energy of boranes. And the last table lists the bond angle parameters of boranes.

Next in Chapter 22 is a discussion of Alkyl Boranes ($R_xB_yH_z$ where R = Alkyl). Charge density pictures of Trimethylborane, Tetramethyldiborane, and Methyldecaborane are shown.

Finally, a table of the geometrical bond parameters of alkyl boranes is presented. The next table shown is the MO to HO intercept geometrical bond parameters of alkyl boranes. The next table lists the energy parameters of the functional group of alkyl boranes. After that, the next table lists the total bond energy of alkyl boranes. And the last table lists the bond angle parameters of alkyl boranes. At the end of the chapter are 5 summary tables of Borane molecules.

Calculation

I have verified that Equations 22.1-22.5 and their values are true and correct.

I have verified that Equations 22.6-22.9 and their values are correct.

I have verified that Equations 22.10-22.13 and their values are true and correct.

I have verified that Equations 22.14-22.17 and their values are correct.

I have verified that all entries in Table 22.1 on page 1237are correct.

I have verified that Equations 22.18-22.24 are true and correct.

I have verified that Equations 22.6-22.7 and 22.25, 22.28, 22.29 and their values are correct.

I have verified that Equations 22.30, 22.32, 22.34, and 22.31 plus its value are true and correct.

I have verified that Equation 22.35 and its value and Eqn. 22.36 are correct.

I have verified that Equation 22.38 and 22.39 plus its value are correct.

I have verified that all entries in Table 22.2 are correct.

I have verified that all calculated entries in Table 22.3 are correct.

I have verified that all entries in Table 22.4 are correct.

I have verified that all calculated entries in Table 22.5 are correct.

I have verified that all calculated entries in Table 22.6 are correct.

I have verified that all values in columns 4-7 in Table 22.7 are correct. Also, in the same table, all the values in column 14 are correct and all the calculated θ's are correct.

I have verified that all values in Table 22.8 are correct.

I have verified that all entries in Table 22.9 are correct.

I have verified that all calculated entries in Table 22.10 are correct.

I have verified that all the entries for Table 22.11 are correct.

I have verified that all 304 entries for Table 22.12 are correct.

I have verified that all the entries in Table 22.13 are correct.

In Table 22.14, I have verified as correct all the values in columns 4-7. Also, all values in column 14 are verified as correct. And all Calc. θ values are correct, except I couldn't verify row 6 and row 12 - I just didn't know how to go about calculating them. I didn't know what equation to use.

In the Summary Tables section at the end of Chapter 22, I was able to verify that all calculated values in Table 22.35.1 are correct.

All relative errors in Tables 22.35.2, 22.35.3, 22.35.4, and 22.35.5 have been verified as correct.

Conclusion

I was able to verify that the GUTCP results of Chapter 22 are in excellent agreement with my own calculations. I successfully reproduced all of the equations and their corresponding values found in Chapter 22. This chapter demonstrates that the GUTCP theory is successful at describing boron molecules, based on them being built from functional groups. I have also verified virtually all of the calculated values in Tables 22.1 through 22.14 as being correct.

I find my results and calculations to be confirmation that the calculations and equations of Chapter 22 are indeed accurate, valid, and reproducible.