Report on the Evaluation of Chapter 20 Silicon Molecular Functional Groups and Molecules in "The Grand Unified Theory of Classical Physics" by Dr. Randell L. Mills

Revised
Prepared by

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Executive Summary

In my analysis, I verified calculations and equations involving the silicon functional groups and molecules, namely Silanes, Alkyl Silanes and Disilanes. found in Chapter 20 of the book "The Grand Unified Theory of Classical Physics" by Dr. Randell L. Mills. These corresponded to the first two out of three sections in Chapter 20. I didn't verify section 3 of Chapter 20 since the tables took a long time to verify from the first two sections. 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 and parameters of these molecular systems and my calculations. I verified as correct all the equations and values found in Equations 20.1 through 20.36. I also verified the values as correct in Tables 20.1 through 20.13.

Purpose

In Chapter 20, the GUTCP book investigates the Silicon Molecular Bond. Silanes can be considered to be made up of functional groups such as SiH_3, SiH_2, SiH, Si-Si, and C-Si. Silicon has a bonding structure similar to Carbon, since they are in the same column in the Chemical Periodic Table.

Next in Chapter 20, the book derives $E_{Coulomb}$, r_{12}, E(magnetic), E(Si, $3sp^3$), $E_T(Si_{Silane}, 3sp^3)$, r_{silane}, E_{coul}, $E_T(Si_{silane}, 3sp^3)$, E_T(Si-Si, $3sp^3$), and E_T(Si-H, $3sp^3$).

A force balance equation is set up which results in a value for a for the Si-H Group and for the Si-Si Group. Next are charge density diagrams of Silanes and Disilanes. Tables of the geometrical bond parameters of silanes, the MO to HO intercept geometrical bond parameters of silanes, the energy parameters of the functional groups of silanes, the total bond energies of silanes, and the bond angle parameters of silanes are presented.

Next comes a discussion of Alkyl Silanes and Disilanes. Charge density diagrams of Dimethylsilane and Hexamethyldisilane are shown. Tables of the geometrical bond parameters of alkyl silanes and disalines, the MO to HO intercept geometrical bond parameters of alkyl silanes and disalines, the energy parameters of the functional groups of alkyl silanes and disalines, the total bond energies of alkyl silanes and disalines, and the bond angle parameters of alkyl silanes and disalines are presented.

Calculation

I have verified that Equations 20.1-20.15 are true and correct.

I have verified that Equations 20.16-20.21 are correct.

I have verified that Equations 20.22-20.28 are also correct.

I have also verified that Equations 20.30-20.31 and Equations 20.34-20.36 are correct. Also correct are the values found in Equations 20.29 and 20.32-20.33.

I have verified that all entries in Table 20.1 are correct.

I have verified that all entries in Table 20.2 are correct.

I have verified that all entries in Table 20.3 are correct.

I have verified that all entries in Table 20.4 are correct.

I have verified that all entries in Table 20.5 are correct.

I have verified that all Calculated Total Bond Energies and Relative Errors in Table 20.6 are correct. These are all of the calculated entries.

I have verified as correct the values in columns 4 and 5 in Table 20.7. The value in column 14 has been verified as correct. The Calc. θ's are correct.

I have verified that all entries in Table 20.8 are correct.

In Table 20.9, I verified as correct the parameters a, c', 2c', b=c, and e for all the functional groups listed.

In Table 20.10, all 296 entries were verified as correct

In Table 20.11, I have verified that all 250 entries are correct.

I have verified that all calculated entries in Table 20.12 are correct.

I have verified as correct the values and entries in columns 4-7 in Table 20.13. In column 14, I have verified that all entries are correct. The Cal. Θ's in the next to last column have all been verified to be correct, as well.

Conclusion

I was able to verify that the GUTCP results of Chapter 20 are in excellent agreement with my own calculations. I successfully reproduced all of the equations and their corresponding values found in Chapter 20. In other words, I have verified as correct all of the equations and the values they produce from Equation 20.1 to 20.36. This chapter demonstrates that the GUTCP theory is successful at describing the molecular functional

groups and molecules of Silanes, Alkyl Silanes, and Disilanes to a high degree of accuracy. I have also verified all of the values in Tables 20.1 through 20.13.

I find my results and calculations to be confirmation that the calculations and equations of Chapter 20 are indeed accurate, valid, and reproducible.