Report on the Evaluation of Chapter 23 Organometallic and Coordinate Functional Groups and Molecules in "The Grand Unified Theory of Classical Physics" by Dr. Randell L. Mills

Prepared by

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

April 27, 2020

Executive Summary

In my analysis, I verified calculations and equations involving Alkyl Aluminum Hydrides, bridging bonds of Al-H-Al and Al-C-Al, and Scandium functional groups and molecules that are formed from them, found in Chapter 23 of the book "The Grand Unified Theory of Classical Physics" by Dr. Randell L. Mills (January 2020 edition). There is a remarkably good agreement between the GUTCP calculated values for the energies and parameters of these functional groups and my calculations. I verified as correct all the equations and values found in Equations 23.1 through 23.55. I also verified all the calculated values in Tables 23.1 through 23.5 as correct. Tables 23.6 and 23.8 had a few minor values that were off. I also verified all the calculated values in Tables 23.7, and 23.9 through 23.11 as correct. In Tables 23.97.1 through 23.97.17 in the Summary at the end of the chapter, I verified that all of the relative errors in the tables were correct (with a few minor errors detected). I did not review the sections of the chapter between the Scandium Functional Groups and the Summary Tables since most of the tables in this chapter were large and took me so long to verify every entry in those extensive tables. Overall, there was a remarkable agreement between the calculated values based on the GUTCP theory and the corresponding experimental values.

Purpose

In Chapter 23, the GUTCP book investigates Alkyl Aluminum Hydrides. E_{Total}, $E_{coulomb}$, and $E_{magnetic}$ are calculated first. Then the force balance equation is used to find a = semimajor axis.

Next is a section on the bridging bonds of Al-H-Al and Al-C-Al. A force balance equation is used to find a = semimajor axis for them. A charge density picture of Trimethylaluminum is shown next.

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

Next in Chapter 23 is a discussion of the Transition Metal Organometallic and Coordinate Bond. The force balance equation is used to find a = semimajor axis. Next comes a discussion of Scandium coordinate compounds. E_{Total}, $E_{coulomb}$, and $E_{magnetic}$ are calculated. A charge density picture of Scandium Trifluoride is shown next.

Finally, a table of the geometrical bond parameters of Scandium coordinate compounds is presented. The next table shown is the MO to HO intercept geometrical bond parameters of Scandium coordinate compounds. The next table lists the energy parameters of the

functional group of Scandium coordinate compounds. After that, the last table lists the total bond energy of gaseous-state Scandium coordinate compounds. At the end of the chapter are 17 summary tables of organometallic and coordinate molecules from the chapter.

Calculation

I have verified that Equations 23.1-23.21 are true and correct.

I have verified that Equations 23.23-24 are correct.

I have verified that Equations 23.28-23.36 are true and correct.

I have verified that Equations 23.38-23.44 and their values are correct.

I have verified that all entries in Table 23.1 are correct.

I have verified that Equations 23.46-23.55 are true and correct.

I have verified that all entries in Table 23.2 are correct.

I have verified that all calculated entries in Table 23.3 are correct.

I have verified that all entries in Table 23.4 are correct.

I have verified that all calculated entries in Table 23.5 are correct.

I have verified that all calculated entries in Table 23.6 are correct, except for the -1.85836 values in column 14. I didn't know where that value came from.

I have verified that all values in Table 23.7 are correct.

I have verified that all values in Table 23.8 are correct except for two. In Table 23.8, in the Sc-F(c) Group column, Mills got b,c=1.45521, but I got 1.42441. And Mills got e=0.74040, while I got 0.74532.

I have verified that all entries in Table 23.9 are correct.

I have verified that all calculated entries in Table 23.10 are correct.

I have verified that all entries in Table 23.11 are correct.

In the Summary Tables section at the end of Chapter 23, I was able to verify that all calculated values in Table 23.97.1-2 are correct.

In Table 23.97.4, all relative errors are correct, except in the 3rd row, for the Relative Error, Mills got -0.00775, while I got -0.00773.

All relative errors in Tables 23.97.5-12 have been verified as correct.

All relative errors in Tables 23.97.14-17 have been verified as correct.

Conclusion

I was able to verify that the GUTCP results of Chapter 23 in the sections I studied are in excellent agreement with my own calculations. I successfully reproduced all of the equations and their corresponding values found in Chapter 23 for the sections on Alkyl Aluminum Hydrides, bridging bonds of Al-H-Al and Al-C-Al, Scandium functional groups and molecules, and the Relative Errors listed in the Summary Tables for Chapter 23. This chapter demonstrates that the GUTCP theory is successful at describing such molecules as just described, based on them being built from functional groups. I have also verified virtually all of the calculated values in Tables 23.1 through 23.11 as being correct.

I find my results and calculations to be confirmation that the calculations and equations in the sections of Chapter 23 I investigated are indeed accurate, valid, and reproducible.