Report on the Evaluation of Chapter 21 The Nature of the Semiconductor Bond of Silicon 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 the semiconductor bond of silicon found in Chapter 21 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 solid semiconductor silicon and my calculations. I verified as correct all the equations and values found in Equations 21.1 through 21.6. I also verified all the calculated values in Tables 21.1 through 21.6 as correct. There was a remarkable agreement between the calculated value for the band gap energy in silicon based on the GUTCP theory and the experimental value.

Purpose

In Chapter 21, the GUTCP book investigates the Semiconductor Bond in Silicon. First discussed are alloys and semiconductor compound materials, such as gallium arsenide and indium antimonide. Then comes a discussion about the doping of semiconductors with trace amounts of nearby elements, resulting in n-type and p-type semiconductors.

Next, $E_{magnetic}$ is calculated. Then diagrams of the diamond structure of silicon in the insulator state are shown. Scanning Tunneling Microscope (STM) photographs of silicon surfaces are shown to compare to these.

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

Next in Chapter 21 is a discussion of the band gap between the conducting band and the filled valence band. Then come diagrams of the covalent diamond-structure network of the unit cell of crystalline silicon.

Next in Chapter 21, the book calculates the Si+ ion-electron separation distance = d = c'.

Finally, the E_T(band gap) and E_g =band gap energy of silicon are calculated. There is excellent agreement between the GUTCP calculated band gap energy of silicon E_g and the known experimental value.

Calculation

I have verified that Equations 21.1-21.2 are true and correct.

I have verified that Equations 21.4-21.6 are correct.

The value for the band gap energy of silicon found in Eqn. 21.6 is in excellent agreement with the experimental value.

I have verified that all entries in Table 21.1 are correct.

I have verified that all calculated entries in Table 21.2 are correct.

I have verified that all entries in Table 21.3 are correct.

I have verified that all calculated entries in Table 21.4 are correct.

I have verified that all calculated entries in Table 21.5 are correct.

I have verified that all calculated entries in Table 21.6 are correct.

Conclusion

I was able to verify that the GUTCP results of Chapter 21 are in excellent agreement with my own calculations. I successfully reproduced all of the equations and most of their corresponding values found in Chapter 21. This chapter demonstrates that the GUTCP theory is successful at describing the semiconductor bond of solid silicon. I have also verified all of the calculated values in Tables 21.1 through 21.6 as being correct.

I find my results and calculations to be confirmation that the calculations and equations of Chapter 21 are indeed accurate, valid, and reproducible. The calculated band gap energy of silicon calculated from the GUTCP theory is in excellent agreement with the known experimental band gap energy.