

1.5: Discussion Questions

Group essay project:

Join a group of classmates from your inorganic chemistry course. Each group should have 3 or 4 students. Arrange a time to meet for an hour or so. Prior to the meeting, read part I (pp. 1367-1391) as well as the summary at the end of Linus Pauling's article (J. Am. Chem. Soc. 1931, 53, 1367-1400) on the nature of the chemical bond.

This paper was published only a few years after Schrödinger developed the quantum mechanical theory of atomic orbitals and is considered one of the most important papers in the history of modern chemistry. At the meeting, discuss the following questions: (1) What was understood about chemical bonding in molecules before Pauling published this work? (2) What new concepts did the paper introduce that we still use today? (3) Why were these ideas important? and (4) What, if anything, did Pauling get wrong, and why?

Together with your classmates, write a 1-2 page essay addressing these questions. Please include the names of all students in your group on the first page; all of you will receive the same grade on this assignment. Anonymous excerpts from a few of these essays will be shared with the class.

In-class discussion questions from this chapter:

- What are inequivalent resonance structures? Illustrate with some new examples not covered above.
- Explain no-bond resonance and hypervalency, using some new examples.
- What are the limitations of valence bond theory for molecules that contain an odd number of electrons? Illustrate with one or two examples.

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