

Preface

This text has grown out of several years of teaching this material at several different colleges. The feedback I have received from my students has been incredibly. I have tried to choose example that seemed to work particularly well in aiding students to gain an understanding of the material while grounding complex concepts in more familiar experiences and intuitions.

In writing this text, I have tried to maintain a connection to measurable phenomena when discussing the otherwise abstract quantum mechanical models. In particular, I have attempted to follow the development of each model with specific spectroscopic examples which utilize the basic models as foundations to understand the behavior of real chemical systems. My experience is that the methodology works better than simply talking about quantum mechanics first, and then following with a discussion of spectroscopy, as though the two topics are not related.

Also toward that end, I have included a great deal of the applications of group theory into the text. While group theory is often the bailiwick of inorganic chemistry, I find that it is also very useful in the descriptions of molecular vibrations, molecular orbitals, selection rules, and other topics that are typically discussed in a course in physical chemistry.

It is my sincere hope that by feathering these two topics into the discussion of quantum chemistry that students will not simply get bogged down in the minutia of complex equations and math, but rather have the chance to see the “big picture.”

And, as always, I wish all students who study physical chemistry all of the best in their endeavors. May the expectation value of your experience be satisfaction!