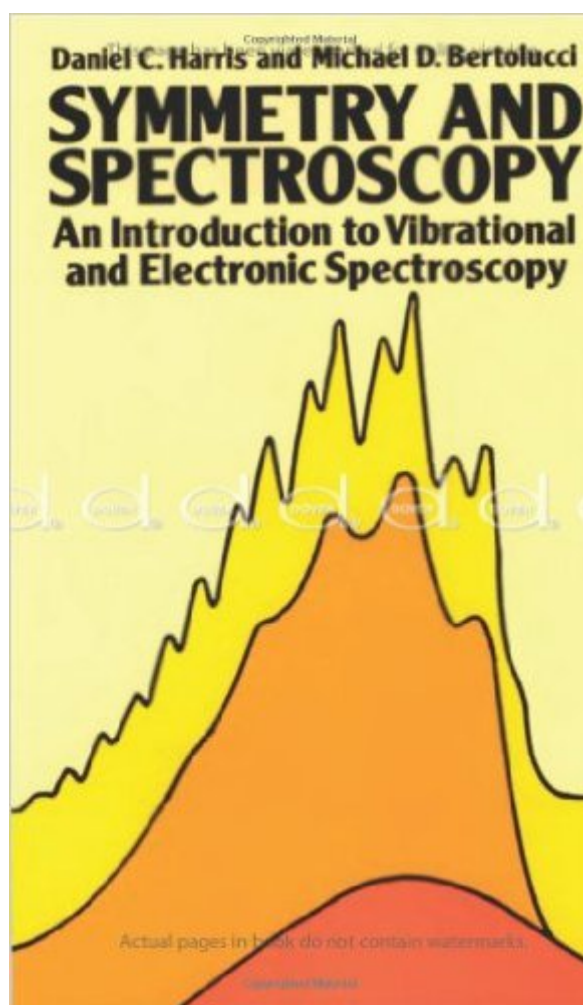


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# Symmetry And Spectroscopy: An Introduction To Vibrational And Electronic Spectroscopy (Dover Books On Chemistry)



## Synopsis

"The authors use an informal but highly effective writing style to present a uniform and consistent treatment of the subject matter." — Journal of Chemical Education. The primary focus of this text is to introduce students to vibrational and electronic spectroscopy, presenting applications of group theory to the interpretation of UV, visible, and infrared spectra without assuming a high level of background knowledge. The text is divided into five chapters that address the fundamentals of group theory, qualitative aspects of quantum mechanics, vibrational spectroscopy, molecular orbital theory, and electronic spectroscopy. To make the exposition clear and meaningful, each new concept is applied or illustrated with experimental results as quickly as possible. In addition, each chapter features a large number of relevant problems through which students can test their understanding of text material. These problems are an integral part of the text and sometimes introduce new material. Solutions to the problems (often accompanied by detailed explanations) can be found in an appendix. Carefully written to provide a solid foundation in spectroscopic analysis, the book devotes significant attention to the interpretation and significance of vibrational and electronic spectra, including good introductory material on Raman and photo-electron spectroscopy, vibronic analysis, and transition metal complexes. Moreover, many of the concepts presented clearly here can be easily extended to studies in other fields of chemistry. Also included are numerous helpful figures and line drawings illustrating important concepts.

## Book Information

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## Customer Reviews

Harris and Bertolucci have written an excellent overview of general spectroscopy theory, appropriate for both undergraduate and graduate students. As a chemist, I found it very helpful as I took introductory quantum mechanics in graduate school and later used it as a practical guide to interpreting and understanding infrared spectra as a graduate student. For the price, this is one of the best bargains available to students. Consider other Dover publications for great prices as well.

This is the best book for those who don't have or don't remember any quantum mechanics background. The language is very simple to understand for non-English speakers. A good book with low price for personal library.

This is probably one of the most useful books that deals with the subject of Molecular symmetry and how it applies to the derivation of IR Spectra, Molecular Orbital Theory, and UV VIS spec. Some parts can be sparse (Term symbol section is a little confusing at first go) so it pays to have a good Quant. book next to you... Lots of problems that are all solved. Excellent reference for some basic QM problems as well... Perhaps the best thing about this book is the fact that it is not (expensive)... So if you have the dosh, then go for it and finally figure out Group Theory and how it relates to IR and everything else...

This book has served as a companion text for courses I've taught in Symmetry and Group Theory and in Physical Methods in Inorganic Chemistry for the past two years. It provides a solid background for practicing chemists who will use electronic and vibrational spectroscopy in their everyday research, though it is only an introduction for serious spectroscopists. The book adopts an easy conversational tone that appeals to students but doesn't fail to provide an appropriate level of rigor - with one notable exception to be mentioned below. For a student seeking to learn by self-study there is a good supply of problems, with solutions provided, to deepen understanding. The examples are most plentiful in the vibrational spectroscopic sections. Both photoelectron and UV-Visible spectroscopy are presented, and Harris and Bertolucci do a better job at teaching what electron states are than Cotton does in his well-known "Chemical Applications of Group Theory". Unfortunately, however, electronic spectra of transition metal complexes are given short shrift and ligand-field-theoretic problems are not adequately fleshed out. Equally unfortunate is the fact that the one transition-metal example of vibronic coupling provided in the body of the text is the same example presented by Cotton: the polarized spectra of  $\text{trans-}[\text{Co}(\text{en})_2\text{Cl}_2]^+$  - and the authors have transcribed exactly the same serious error: One of the vibrational modes is wrong and one of the

electronic absorption peaks are misassigned as a result. These problems notwithstanding, this is very good book - I recommend it to students and teachers as an affordable, instructive, and very readable text.

Although I am an undergraduate physics student but this is one of the best book on the vibrational spectroscopy, I used it to understand the application of the group theory and molecular vibrations. Harris and Bertolucci wrote the text in a clear way with examples. I am only half way through the book but the way the text is presented, its evident how the rest of the book will be, Clear and to the point. Only minus point is that the character tables are not derived and are given in appendix and it also lacks the representation theory but after all it is a book on Spectroscopy and not on Group theory so I may not complain. In my opinion, this book can be compared with Cotton and Bishop and if I have to understand the application of group theory and molecular vibrations I will certainly pick up Harris & Bertolucci.

I bought this book about half way through my postgraduate studies in Physical chemistry, then immediately kicked myself for not buying it earlier. If you're a bit rusty in QM, as I was, then the chapter on QM is worth the price of admission alone, the same could really be said for all of the 5 chapters (Group Theory, QM, Vibrations, MO Theory and Electronic Transitions) though as they are all clear, well constructed, with nice problems (and solutions for most). Great introduction for any aspiring Physical Chemist.

Filled with fun little quips, the book starts a little heavy (it definitely helps if you already have a basic symmetry background) but eases up as you go. I recommend a supplemental symmetry book just for extra practice. All answers to the questions are in the back of the book (which I love) but there are very few practice problems throughout the book which is what I generally thrive on so if you don't understand how they got the answer you're a bit out of luck. With all that being said, I really do love Dan Harris' books. For under \$20, you can't beat this!

There was really no need for my short review to convince anyone interested or even marginally active in the field of molecular spectroscopy that the SYMMETRY AND SPECTROSCOPY-Introduction to Vibrational and Electronic Spectroscopy by D.C. Harris and M.D. Bertolucci is an excellent presentation of the underlying physical principles, the laws and parameters involved in the measurement and, above all and in accordance with the title, the

involvement of symmetry on the appearance of vibrational and electronic spectra. Recommended, in my opinion, to both students and tutors, and to those interested in the application or the theoretical part of the aforementioned spectroscopic fields.

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