

Preface

This book, like many other text-books, has its origins in a course given by the author. The course was for beginners in spectroscopy; it was a conventional series of lectures on techniques, with tutorials spent interpreting spectra. This quickly proved that while lecturing is a good way of teaching spectroscopy, lectures on how to interpret spectra have something in common with lectures on how to ride a bicycle. Since most organic chemists regard spectroscopy as a means of gaining structural information about compounds in which they are interested, the course was modified to become a series of workshops, in which a short lecture on a technique was followed by many examples to interpret, while post-graduate students helped with early difficulties. This resulted in a big improvement in the ability of students to get structural data out of spectra, and made the post-graduates wish that they had learned spectroscopy this way, but the exercises in combining the results of all the techniques were less successful. This book aims to correct this problem and is the course I would choose to teach if sufficient workshops were available. It tries to show that each technique has a particular speciality, and that these need to be combined to identify a structure which is consistent with all the spectra.

In a course like this, the question of how much to write about a technique is debatable. One extreme would be to consider only the spectra, and to ignore how they are produced; the other is to delve too deeply into the theory of the method, and leave the student uncertain what to look for in the actual spectrum. I have aimed to be closer to the first extreme than the second, since some excellent detailed books on spectroscopy are available. The theory parts of this book cover approximately the same ground as the video tapes on IR, MS, UV, ^{13}C and ^1H spectra which were made at the University of Liverpool and which are available from the Royal Society of Chemistry.

The spectra should also be useful to teachers who are not trying to teach all the areas of spectroscopy covered here. In many cases, the mass spectrum can be replaced by a molecular formula, though this substantially increases the difficulty of a few problems. Many ^{13}C problems can be solved without ^1H , and *vice versa*, though this will make a few problems too difficult for beginners.

Compiling a collection of spectra like this has required a lot of help, and I am particularly grateful for the help of Sandra Hedges, Ann Leyden, Steve Apter and Allan Mills in running most of them. Thanks are also due to Frank Doran, who discovered samples in remote corners of the Chemistry Department, and Dr. J. A. Race of Micromass, who was very helpful with mass spectrometry. Finally, I must thank Frances Poole, for typing the manuscript.

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