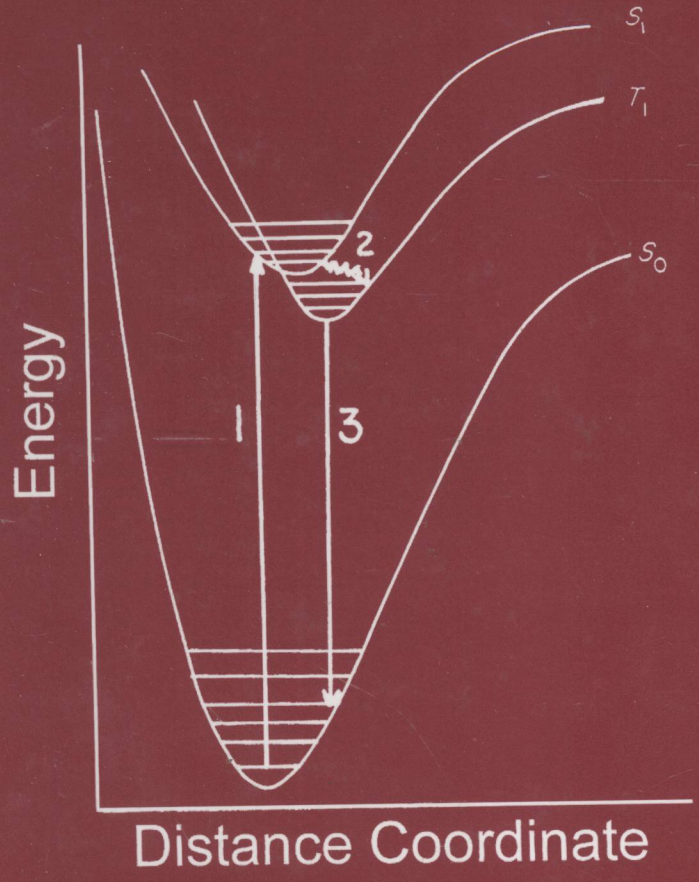
DRUGS AND THE PHARMACEUTICAL SCIENCES VOLUME 160

Spectroscopy of Pharmaceutical Solids



edited by
Harry G. Brittain

Spectroscopy of Pharmaceutical Solids

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Milford, New Jersey, U.S.A.

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Spectroscopy of Pharmaceutical Solids

DRUGS AND THE PHARMACEUTICAL SCIENCES
A Series of Textbooks and Monographs

Preface

Spectroscopic techniques have been widely used in the pharmaceutical sciences to obtain both fundamental and applied information. During the development of any given drug candidate, spectroscopy will be used to establish the structure of the compound and understand its interaction with other constituents. It is also often used as a means for evaluating the analytical characteristics of the bulk drug substance and its formulations. It is no surprise, therefore, that solid-state spectroscopic methods have become extremely important to successful modern drug development.

Many scientists believe themselves to be familiar with the principles that govern the interaction of electromagnetic radiation with matter, and yet their knowledge is often based on partial truths. For instance, most would state that for a molecule to absorb ultraviolet light, an electron must be promoted from one energy level to another. While in some cases there is validity to this belief, the true origin of the transition is a change in the orbital angular momentum of the molecule, and the absorption of a quantum of light causes the transition from one molecular state to another. Genuine knowledge as to the origin of spectroscopic phenomena might not change the routine use of a particular technique, but it would provide a basis that could lead to a more advanced application for that technique.

The reasoning just stated has led to the need for the present volume. However great the use of solid-state spectroscopy might be, a greater degree of fundamental understanding is necessary to obtain maximal use out of each technique. In the present work, the underlying principles of each technique will be sufficiently outlined to provide a thorough and proper understanding of the physics involved, and then applications will be used to illustrate what can be learned through the employment of the method under discussion. Whenever possible, the examples will be drawn from the pharmaceutical literature, but this rule will be violated whenever the author feels that an application from another field might inspire analogous work by a pharmaceutical scientist.

In 1995, I edited a volume entitled "Physical Characterization of Pharmaceutical Solids" in which a fairly extensive overview of methods suitable for work at the molecular, particulate, and bulk levels was provided. Since a substantial portion of this earlier book was concerned with the use of spectroscopy for the characterization of solids having pharmaceutical, the present volume may be viewed as being Volume 1 in the second edition of the older book. In the present volume, the use of spectroscopy for the characterization of pharmaceutical solids has been taken much further, and the range of topics has been greatly extended relative to the coverage of the earlier volume.

Harry G. Brittain

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