

Book Review

Introduction to the Theory of the Raman Effect: by J.A. Koningstein. D. Reidel Publishing Company, Dordrecht, The Netherlands (1972). 166 pp., paperback, price Dfl. 48.00 cloth, Dfl. 31.00 paper.

This book provides a thorough introduction to the theory of the molecular Raman effect, written particularly for chemists. The reader is introduced to a derivation of the Raman scattering tensor in the first chapter, which begins with the classical expressions for the radiation field of dipoles and quadrupoles, and the coefficients for induced and spontaneous emission of radiation. The relation between quantum mechanics and the scattering tensor is clearly presented. While a basic knowledge of quantum mechanics and group theory is assumed, a separate treatment of the algebra and the theoretical aspects of tensors is included, and both Cartesian and irreducible tensors are discussed. The underlying theories of the electronic, vibrational and rotational Raman effects are surveyed, and extensive use is made of the irreducible tensors to explain the selection rules and intensities. There is a separate treatment of Raman depolarization ratios for liquids and gases. In addition to the "normal" Raman effect, this book also discusses the stimulated, inverse, hyper and resonance Raman effects, which have achieved a new significance with the development of laser excitation sources. Dirac's quantum field model is used to explain the stimulated and inverse Raman effects. The hyper and resonance Raman effects are presented in terms of the classical theory. While more chemical examples might have been included, it is understandable that these were limited by the small size of this volume. However, character tables for some of the most important point groups are included.

Of particular interest to readers will be the references given at the end of each chapter. These include many of the classical references, like those to Placzek's theories. Some interesting historical notes on the development of the Raman effect are also included. The publishers should be commended on bringing this volume out in an inexpensive paperback form. It is highly recommended for chemists interested in the Raman effect and its applications, and will also be very useful to graduate students in this field.

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