

Handbook of Spectroscopy

Edited by G. Gauglitz and T. Vo-Dinh



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Preface

The *Handbook of Spectroscopy* is intended to serve as an authoritative reference source for a broad audience involved in the research, teaching, learning, and practice of spectroscopic technologies. Spectroscopy is defined as the science that deals with interactions between electromagnetic radiation and matter. This research field has recently experienced an explosive growth as a result of innovations in methodologies and instrumentation, which offer the possibilities for new applications and novel methods of analysis to solve common analytical problems as well as address new challenges. Research scientists, analytical scientists, environmental investigators, and industrial engineers, who are often confronted with the ever-increasing complexity of real-life sample analysis, need a readily accessible source of information and an authoritative guidance on how to best apply currently available spectroscopic techniques to their particular fields of interest and to their specific applications.

To address this important need, the *Handbook of Spectroscopy* is designed to provide a straightforward introduction to spectroscopy, what this field can do, and how an investigator can use it effectively. The Handbook also provides a clear, integrated, and objective account of the wealth of information that can be derived from spectra. The sequence of chapters covers the entire range of the electromagnetic spectrum and the physical mechanisms involved, from rotation processes in molecules to phenomena in the nucleus.

The Handbook is not designed to be just another treatise on the theory of spectroscopy, but rather a practical day-to-day laboratory guide. The academic level is appropriate for the newcomer to the various fields of spectroscopy; no special knowledge beyond the standard level of a graduate student in the physical or life sciences is required.

In addition to the introductory material, the Handbook provides a comprehensive guide to the state-of-the-art practices in all major fields of spectroscopy. The treatment of each field of spectroscopy presents the most up-to-date developments in methodologies, techniques, instrumentation, and data treatment. The Handbook indicates to the researcher and the practicing spectroscopist how to select the most suitable technique for a specific application, how to adopt the optimal methods of sample preparation and spectra recording, and how to interpret the re-