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## Preface to the Second Edition

To write a second edition of a textbook is a very challenging enterprise for the author in many aspects. First of all it gives the chance to back up the content and the text from the previous edition with all the experience he has collected after the first edition was distributed and to include the full set of advices and recommendations he had received from colleagues and students. As important is the possibility to include new developments in the subject of the book. Solid-state spectroscopy was originally addressed to be most important for our understanding of the solid state. This promise has been more than fulfilled as in the almost ten years after the publication of the first edition many important technical developments of analytical tools has lead to better or even new understanding of materials. Good examples of this progress are the rapid development of synchrotron radiation as an omnipresent light source, the increasing interest in spintronics which promoted the spectroscopy of spin systems or the new subject of transport or electron addition spectroscopy in nanostructures. These and many other subjects are now included in the textbook or were rephrased according to the most recent developments.

Solid-state spectroscopy has still the character of an analytical tool but in a few special cases as for example in the field of luminescence the breakthrough to the market has occurred.

The format of the textbook as it was originally designed was retained in the new edition. In the first and main part of the book basic concepts of the various types of spectroscopy are described with particular emphasis on the physical background of the methods. The sections on synchrotron radiation, photo emission, and on spin resonance were extended and a new chapter was added on spectroscopy of nanostructured solids. On the other hand the contributions from positron annihilation and myon spin resonance were shortened in order to limit the overall text to an acceptable volume. The dedication of the textbook remains as given in the preface of the first English edition and can be inspected there.

In the second part of the book which is again formatted as appendices to the individual chapters, a more detailed presentation is provided to help the

advanced reader or teaching professors in finding the connections to theoretical interpretations. In some cases, where it was demanded from the progress of understanding, parts of the presentations which were originally in the appendices were moved to the main text.

As for the problems new exercises were included to cover the new subjects accepted in the second edition. The problem solutions are still available from the author as an extra booklet with the ISBN number 963 463 268 8 published by H. Kuzmany, M. Hulman and J. Kürti at the Eötvös University in Budapest. New problems are assigned by an upperscale  $n$ . They are unfortunately not included in the booklet.

Due to the lack of space many presentations could not be provided in sufficient detail to allow for immediate application in research and technology. Therefore to each chapter the list of references for further reading was updated with most important recent literature.

Finally it is a great pleasure for me to acknowledge all colleagues who contributed to the better understanding of this textbook by numerous discussions and recommendations during its preparation. Particularly valuable contributions came from Prof. H. Grosse, Prof. Th. Pichler, Dr. R. Pfeiffer, Dr. A. Grüneis, Dr. C. Kramberger, and Mag. W. Plank, Universität Wien, Prof. F. Simon, University of Technology and Economics Budapest, Prof. W. Jantsch, Universität Linz, and Prof. P. Jarillo-Herero, Massachusetts Institute of Technology, Boston. I am also very grateful to our technicians A. Stangl and Ch. Vlcek for helping to get new and updated illustrations for the textbook. Finally, I very much acknowledge the editor-in-chief Dr. Ascheron from Springer Verlag for his continuous stimulations during the preparation of the manuscript and for his patience in receiving it.

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An Introduction

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