Preface

The need for energy storage, energy saving, acceleration of information, development of communications, and the growing worldwide interest in environmental problems, has led researchers to find new materials that can contribute to these vital priorities of the 21st century. Among these materials, superconductors are those which occupy the largest place, because the frame of their applications is enormous. The gain brought by a possible discovery of applicable room temperature superconductors would be one of the greatest achievements of the hard sciences. In this context, the recent discovery of novel superconductors of which several are effective well above the liquid nitrogen temperature and their first applications to industry have resulted in an increasing number of chemists and physicists working in this field. In this area of science, physics and chemistry appear to be extremely entangled: no research in physics and no application of these materials can be achieved without the savoir-faire and the knowledge of solid-state chemists. As a feedback, any progress in the understanding of their solid-state properties leads to the synthesis of new structures.

One important scientific area shared by chemists and physicists is *spectroscopy*. The goal of the Symposium on Applications of Spectroscopy to Superconducting Materials, held in Dallas in 1998, was to combine the strengths and experience of solid-state chemists and physicists from several countries. This book is a detailed account of the talks which were given for this purpose. Because spectroscopy covers the X-ray, microwave, high-energy, and optical ranges, it offers a great variety of tools to investigate the intimate structures of superconductors and the mechanisms governing their properties.

This book gives an up-to-date overview of relevant aspects of spectroscopy applied to superconducting materials. Important techniques have been selected like Raman scattering, infrared absorption, X-ray photoelectron and Auger spectroscopy, time-resolved spectroscopy, microwave plasma resonance, Mössbauer spectroscopy, photoconductivity, and point-contact spectroscopy. Some theoretical papers are also included as well as general papers concerning new materials, magnetotransport phenomena, and structures. I hope the book will be useful to researchers and engineers not necessarily in the field. They will find in it many tools and methods that can be used for studying other classes of materials. I thank the authors who have taken time from their busy activities to present their research at the symposium and to prepare the papers published in this volume.

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