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Volume I, X-ray Absorption Spectroscopy and Related Techniques
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Foreword

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Volume I of *International Tables for Crystallography*, *X-ray Absorption Spectroscopy and Related Techniques*, is a welcome and very timely addition to this encyclopaedic series of volumes, fitting well with the statement of purpose of the International Union of Crystallography (IUCr), 'Advancing structural science globally', that was revisited as part of the 75th anniversary of the organization in 2023. X-ray absorption spectroscopy (XAS) and related techniques such as X-ray emission spectroscopy (XES) complement other structural techniques that are the subject of previous volumes well, expanding the reach and coverage of *International Tables*.

Although there are many excellent books and manuals describing XAS and related techniques, including both practice and theory, there are none as complete or comprehensive as Volume I. The range of topics covered by the present volume is extremely extensive, from the instrumentation needed to perform the experiments, describing the data reduction and analysis, discussing important considerations when preparing samples, presenting theoretical approaches and the statistical significance of the results, and highlighting applications. Each of the nine parts in the volume addresses a specific aspect that is relevant to those who regularly use XAS and related techniques, but also to those who are novices and who would like to understand the potential of using spectroscopy for detailed structure determination. The three Editors have done an exceptional job in attracting many contributions from world experts on the topics covered by the volume, and this is shown in the quality of the final product. The overall result is a very coherent and self-contained volume.

I believe the contents of Volume I will attract interest from a wide variety of researchers. Scientists working on synchrotron beamlines will find that the *Experimental methods* part (Part 3) is an excellent manual describing the instrumentation needed to perform X-ray spectroscopy measurements, and the detectors needed for optimal experiments. It will also serve as a guide for experimentalists interested in improving data quality by optimizing sample preparation and data-collection methods. For those more interested in the fundamentals of the technique, I would recommend Part 2, *Theory*, which includes the theoretical approaches and approximations most often used for the interpretation of XAS and other techniques such as diffraction anomalous fine structure and X-ray magnetic circular/linear dichroism. In my opinion, researchers interested in using XAS for the first time will enjoy Part 5 (*Analysis of experimental data)*, which is an excellent compendium of the many steps required for XAS data reduction and analysis. Personally, as a spectroscopist and expert XAS and XES user, I have found Part 6, *Packages and approaches for data collection and data reduction*, very useful. Descriptions of many of the most frequently used software packages for XAS and XES data analysis and simulations are included, with most of the chapters written by the developers of the codes, and openly discussing their strengths and their limitations. This is a unique feature of the volume, and no other publication exists where all this information can be found in one place. The *Applications* part (Part 8), which focuses on examples showing the applicability of the techniques, will attract the interest of scientists working in many different scientific areas, from catalysis to battery materials, environmental science, bioscience, cultural heritage and many more.

Volume I is consequently a very comprehensive compilation of the fundamentals, state of the art and future directions of XAS and related techniques. I have every expectation that it will become a classic reference text for any expert in the field, but also as a starting manual for those who would like to learn more about the techniques and use them in their research.