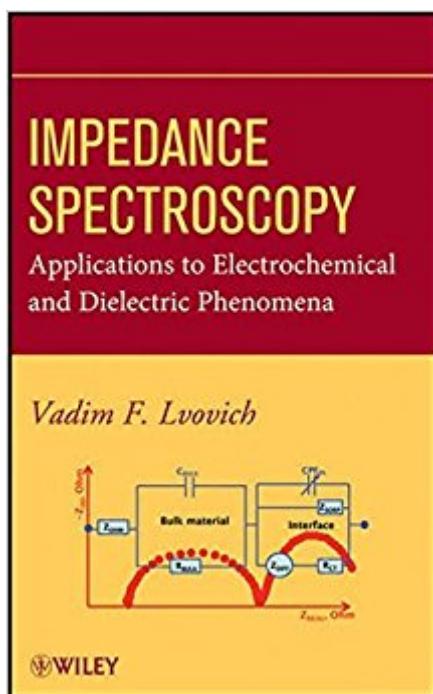


The book was found

Impedance Spectroscopy: Applications To Electrochemical And Dielectric Phenomena



Synopsis

This book presents a balance of theoretical considerations and practical problem solving of electrochemical impedance spectroscopy. This book incorporates the results of the last two decades of research on the theories and applications of impedance spectroscopy, including more detailed reviews of the impedance methods applications in industrial colloids, biomedical sensors and devices, and supercapacitive polymeric films. The book covers all of the topics needed to help readers quickly grasp how to apply their knowledge of impedance spectroscopy methods to their own research problems. It also helps the reader identify whether impedance spectroscopy may be an appropriate method for their particular research problem. This includes understanding how to correctly make impedance measurements, interpret the results, compare results with expected previously published results from similar chemical systems, and use correct mathematical formulas to verify the accuracy of the data. Unique features of the book include theoretical considerations for dealing with modeling, equivalent circuits, and equations in the complex domain, review of impedance instrumentation, best measurement methods for particular systems and alerts to potential sources of errors, equations and circuit diagrams for the most widely used impedance models and applications, figures depicting impedance spectra of typical materials and devices, extensive references to the scientific literature for more information on particular topics and current research, and a review of related techniques and impedance spectroscopy modifications.

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The Guide to Understanding Impedance Spectroscopy and Its Applications Compiling the

cumulative research of the last two decades on theoretical considerations and practical applications of impedance spectroscopy, this book covers all of the topics that will help readers quickly determine whether this technique is an appropriate method of analysis for their own research problems, and how to apply it. This includes understanding how to correctly make impedance measurements, interpret the results, compare these results with previously published information, and use appropriate mathematical formulas to verify data accuracy. Unique to this monograph is an emphasis on practical applications of impedance spectroscopy. Impedance Spectroscopy is developed around a representative catalogue of the most commonly encountered impedance data examples for a large variety of established, emerging, and non-conventional experimental and applied systems. The book also presents theoretical considerations for dealing with impedance data modeling, equivalent circuits, relevant complex domain mathematical equations, and physical and chemical interpretation of the experimental results for many problems encountered in research and industrial settings. A review of impedance instrumentation, selection of best measurement methods for particular systems, and analysis of potential sources of error is also included. Many helpful references to scientific literature for further information on particular topics and current research are offered, along with an overview of impedance spectroscopy modifications and related techniques. Impedance Spectroscopy is primarily addressed to industrial scientists, engineers, researchers, and graduate students working in electrochemistry, chemical engineering, biomedical sciences, advanced materials, renewable energy, sensors, electronics, and other related fields.

Vadim F. Lvovich is currently a Chief Principal Engineer in the Aerospace and Electronics division of Crane Corporation. He also holds a position as an Associate Professor of Chemical Engineering at Case Western Reserve University. His career has encompassed a number of senior level research and development positions in specialty chemicals, petrochemicals, biomedical devices, sensors, and electronics industries. He has authored over forty major research publications and review chapters, received nine patents, and given thirty major conference presentations.

Excellent Reference for EIS.

First a disclaimer: I have been closely associated with Lvovich for most of his career. Caveat Lector. This is the third major tome on Electrochemical Impedance Spectroscopy to appear in the last few years. I have seen Orazem's book, but not Barsoukov's. Orazem's book has a lot more white space; Lvovich's has more examples. If the reader just wants to learn the math, either book

will work, and Orazem's will be easier on the eyes. However, if one wants to see how well EIS works in solving real-world problems, Lvovich's book has more citations and examples. Lvovich's experience at teaching at the Yeager Center at Case Western Reserve University shows. Use Orazem if interested mainly in theory, Lvovich if more interested in materials characterization.

This book can serve as a broad introduction to impedance spectroscopy for researchers who are not as familiar with the technique, as well as a detailed reference for experts who are seeking a better understanding of their test results. Starting with a review of the basic mathematics, the text builds on this foundation with discussions of practical applications and real-world examples. This progression guides the reader to understanding how the theory can be employed in both test design and data interpretation. The focus on applying the theory to experimental analysis makes this an excellent hands-on EIS reference.

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