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978-1-107-41202-6 - Electrically Based Microstructural Characterization III

Edited by Rosario A. Gerhardt, Andrew P. Washabaugh, M.A. Alim and Gyeong Man Choi

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Electrically Based Microstructural Characterization III

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PREFACE

This volume is a compendium of some of the papers that were presented at Symposium R, "Electrically Based Microstructural Characterization III," held November 26-29 at the 2001 MRS Fall Meeting in Boston, Massachusetts. Some of the papers not included here will be published in the *Journal of Materials Research*, *Journal of Electroceramics*, *Journal of Applied Physics*, and *Materials Microstructure* to name a few.

Due to the unfortunate 9/11 events, a few invited speakers were unable to attend; nevertheless the symposium went on as planned with a few adjustments to the schedule. This was the third symposium on this topic sponsored by MRS, which focused on the application of electrical measurements as a non-destructive tool for microstructural characterization. As in previous symposia, many of the papers showed how the usage of dc and ac resistivity measurements, complex impedance analysis, ellipsometry, and capacitance-voltage measurements could be used to assess phase transformations, presence of grain boundary layers with different electrical response, anisotropy, mechanical degradation, presence of defects and porosity in a wide range of materials and devices. Repeat participants noted how much we had all learned from one another since the first Meeting in 1995. At the same time, there were a good number of new participants who talked about newly developed experimental techniques, applications of the methods to new materials or new ways of interpreting the measured data. The development of scanning impedance imaging by applying a lateral bias to an AFM specimen deserves special mention as this opens up many opportunities for simultaneous electrical property and microstructural data acquisition. It is to be noted that this was the first time that impedance spectroscopy has been used to characterize metallic alloys in the metallic state in the absence of liquid electrolytes. There were several papers focused on characterizing components in various microelectronic devices, with an emphasis on the materials interpretation rather than the device interpretation. The description of a new method of analysis for magnetic materials, i.e. inductance spectroscopy, also deserves mention. In summary, the papers in this volume cover all classes of materials: semiconductors, metals, electro-ceramics, polymers, liquid crystals and a variety of composites. This book has been arranged similar to the symposium program where papers were presented according to material types and applications.

The organizers wish to thank all of the participants and invited speakers for their excellent presentations. We are especially indebted to those who took the time to contribute to this volume and the promptness with which they made requested changes. All of these manuscripts are also available electronically via the MRS website. We would also like to thank the MRS staff for their continuous support. Finally, we would like to acknowledge the financial support from the U.S. Department of Energy.

Rosario A. Gerhardt
Andrew P. Washabaugh
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