DESCRIPTION

Adopting a didactical approach from fundamentals to actual experiments and applications, this handbook and ready reference covers real-time observations using modern scanning electron microscopy and transmission electron microscopy, while also providing information on the required stages and samples. The text begins with introductory material and the basics, before describing advancements and applications in dynamic transmission electron microscopy and reflection electron microscopy. Subsequently, the techniques needed to determine growth processes, chemical reactions and oxidation, irradiation effects, mechanical, magnetic, and ferroelectric properties as well as cathodoluminiscence and electromigration are discussed.

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Professor Gerhard Dehm is the department head of Materials Physics at the Montanuniversität Leoben, Austria, and director of the Erich Schmid Institute of Materials Science from the Austrian Academy of Sciences. He has worked previously at the Max-Planck-Institute for Metals Research in Stuttgart and the Department of Materials Engineering at the Technion in Haifa. Gerhard Dehm has authored about 200 scientific publications and organized several international symposia in the field of in situ characterization. He received several scientific awards including the Masing Award from the German Society of Materials Science (DGM) and the award for Nanosciences and Nanotechnology from the State of Styria (Austria).
James M. Howe is the Thomas Goodwin Digges Chaired Professor and Director of the Nanoscale Materials Characterization Facility in the Department of Materials Science and Engineering at the University of Virginia (USA). He has been a visiting professor at the University of Vienna and Osaka University. Dr. Howe has published over 200 technical papers, four book chapters and four symposium proceedings, and is author of the textbook 'Interfaces in Materials' and co-author of the textbook ‘Transmission Electron Microscopy and Diffractometry of Materials’. For his research, he has received several awards including a von Humboldt Senior Research Award, the ASM Materials Science Research Silver Medal, and the TMS Champion H. Mathewson Medal.

Professor Josef Zweck is head of the electron microscopy group at the University of Regensburg's physics faculty (Germany). An important branch of his work specializes in imaging of intrinsic magnetic and electrostatic fields and their in-situ manipulation by specialized specimen holders. He is board member of Germany's society for electron microscopy (DGE) since 1996 and presides it in the years 2012 and 2013. He has authored well over 100 scientific publications and is referee for numerous scientific journals. He was involved in numerous organizations of the German Physical society's (DPG, Deutsche Physikalische Gesellschaft) annual meetings, as well as national and international congresses on electron microscopy, especially in 1997 when he hosted the 'Dreiländertagung' ('three countries conference', Austria, Switzerland and Germany) in Regensburg. This congress will return to Regensburg in 2013 as a multinational conference with now 10 countries involved.

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