## DESCRIPTION

Retaining its proven concept, the second edition of this ready reference specifically addresses the need of materials engineers for reliable, detailed information on modern material characterization methods.

As such, it provides a systematic overview of the increasingly important field of characterization of engineering materials with the help of neutrons and synchrotron radiation. The first part introduces readers to the fundamentals of structure-property relationships in materials and the radiation sources suitable for materials characterization.

The second part then focuses on such characterization techniques as diffraction and scattering methods, as well as direct imaging and tomography. The third part presents new and emerging methods of materials characterization in the field of 3D characterization techniques like three-dimensional X-ray diffraction microscopy. The fourth and final part is a collection of examples that demonstrate the application of the methods introduced in the first parts to problems in materials science.

With thoroughly revised and updated chapters and now containing about 20% new material, this is the must-have, in-depth resource on this highly relevant topic.
ABOUT THE AUTHOR

Born in 1962, Peter Staron studied Physics at the University of Hamburg and gained his doctorate from the University of Hamburg in 1997. Starting with the PhD thesis, he worked at the Institute of Materials Research of the Helmholtz-Zentrum Geesthacht and dedicated his work to the use of neutron scattering techniques in materials science with a focus on residual stresses, precipitation kinetics and programming. In 2008 he included high-energy X-rays in his work and started giving a lecture on scattering methods in engineering materials research at the Montanuniversität Leoben.

Born in 1963, Andreas Schreyer studied physics and geophysics at the Ruhr-Universität Bochum, gaining his doctorate in 1994 and his lecturing qualification in 2000. In 2001 he became Professor at the University of Hamburg and the head of the Department Materials Characterization with Neutron and Synchrotron Radiation at the Helmholtz-Zentrum Geesthacht. From 2006 to 2016 he was head of the Institute of Materials Research at the Helmholtz-Zentrum Geesthacht responsible for Materials Physics. Between 2008 and 2015 Professor Schreyer has been the spokesperson of the Helmholtz Program "From Matter to Materials and Life" of the Helmholtz Association coordinating all activities in the field of large-scale facilities for synchrotron radiation, neutrons, ions, and highest electromagnetic fields.

In 2016 he moved to the European Spallation Source in Lund, Sweden, where he is the Director for Science.

Born in 1957, Helmut Clemens studied materials science at the Montanuniversität Leoben, Austria, gaining his doctorate in 1987. He joined Plansee AG, Austria, as head of the Advanced Materials R&D group in 1990, gaining his lecturing qualification in 1997. From 1998 to 2000 he was Professor for Metallic Materials at the Institute for Physical Metallurgy, University of Stuttgart, before moving to the Institute for Materials Research, Helmholtz-Zentrum, Geesthacht, in a joint appointment as Professor at the University of Kiel. Since July 2003 he is head of the Department of Physical Metallurgy and Materials Testing at the Montanuniversität Leoben. Professor Clemens has won several awards, including the prestigious Honda Prize.

Born in 1981, Svea Mayer studied materials science at the Montanuniversität Leoben, Austria, and received her PhD in 2009. Since then, she is leading the working group on phase transformations and high-temperature materials at the Department of Physical Metallurgy and Materials Testing, Montanuniversität Leoben. In 2011 she was accepted as assistant professor and started lecturing. Her prime research topic is the use of neutrons and synchrotron radiation for the development of novel high-temperature materials.

She is member of review panels and for her academic achievements she was awarded with the Georg-Sachs-Prize of the Deutsche Gesellschaft für Materialkunde e.V.
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