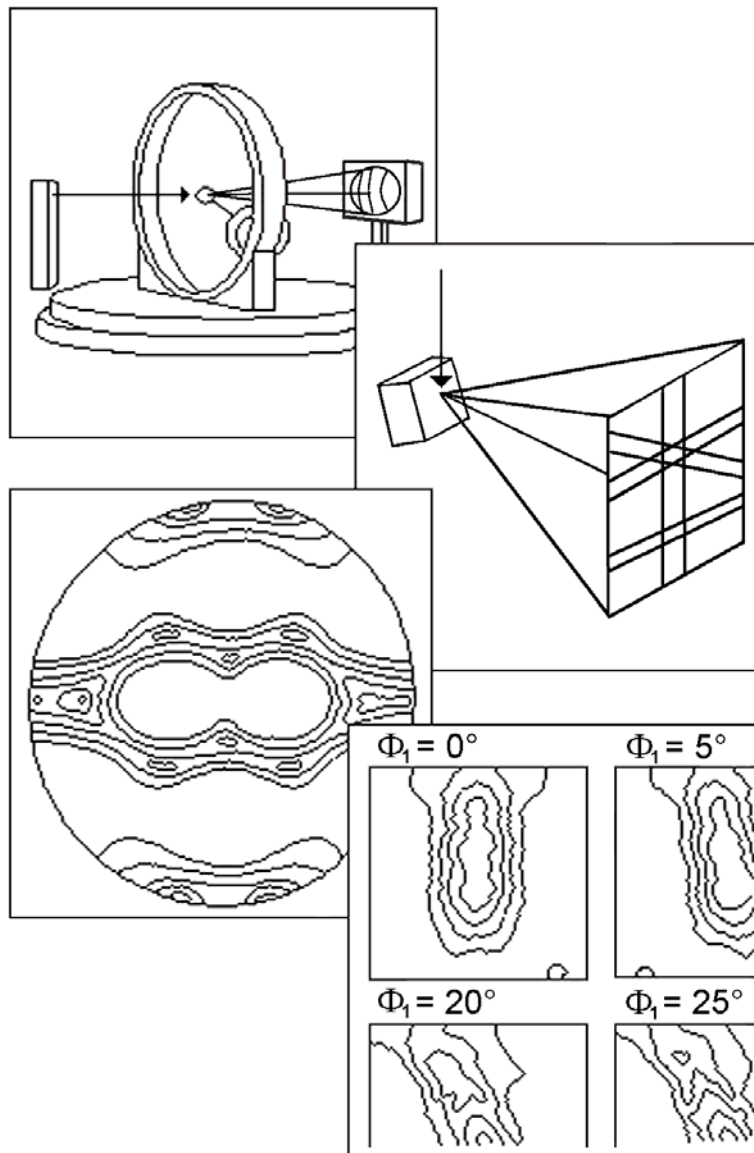


TEXTURE and ANISOTROPY of POLYCRYSTALS III



Editors

H. Klein and R.A. Schwarzer

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**Proceedings of the 3rd International Conference on
Texture and Anisotropy of Polycrystals (ITAP-3)
held in Göttingen, Germany, 23 – 25 September 2009**

Edited by

H. Klein and R.A. Schwarzer

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Foreword

The Third International Conference on Texture and Anisotropy of Polycrystals, ITAP-3, took place at the Geoscience Center of the University of Göttingen, Germany, on 23 – 25 September 2009, following the intentions and guidelines of ITAP-1 in Clausthal (Germany) 1997 and ITAP-2 in Metz (France) 2004. The purpose of this regional conference was to bring together renowned scientists, researchers, developers, practitioners and students in an informal setting to present and to discuss new and current work.

The conference also hosted four one-day workshops on September 21 and 22. They covered the following topics:

- An Introduction to EBSD and Orientation Microscopy
by Robert Schwarzer and Stefan Zaeferrer
- MAUD workshop: From Diffraction Images to Texture
by Luca Lutterotti and Daniel Chateigner
- MTEX – Open-Source Software for Texture Analysis
by Ralf Hielscher and Helmut Schaeben
- Texture Analysis at Large Scale Facilities – Neutron and Synchrotron Radiation
organized by Hans-Günter Brokmeier.

The conference particularly encouraged the interaction of research students and developing academics with the more established community to foster further cooperation and exchange of ideas. About 100 registered representatives attended the conference. This is all the more remarkable in view of the economic restrictions to which the related industries might have been exposed. The actual economic crisis also cast shadows on the conference in that only a few delegates from industry had got an opportunity to attend.

The great majority of solid-state materials – natural as well as man-made ones – have a polycrystalline structure that is characterized by the size, shape, arrangement and orientation of the constituting crystals. Crystal orientation is particularly important due to the anisotropy of many physical properties. Therefore, the study of preferred crystal orientations, or crystallographic texture, is of major interest in research and industrial application.

- First of all, texture is one of the fundamental parameters, in addition to crystal structure, lattice defects and element composition, to characterize solid-state materials.
- Texture changes are indicative of solid-state processes of all kind; hence texture can be utilized to advantage in failure analysis as a fingerprint of proper use or misuse of a work-piece.
- Texture enables the geologist to shed light on the processes of rock forming which took place in early days of the history of Earth.
- The knowledge of texture is a prerequisite for all quantitative techniques of materials characterization, which are based on the interpretation of diffraction peak intensities such as the determination of the content of residual austenite in steel, the determination of residual stress by X-ray diffraction, and structure analysis from powder diffraction patterns.
- Most important, however, is texture as the link between anisotropic properties of single crystals and those of polycrystalline material. Its knowledge is utilized in the development and optimization of anisotropic properties of modern structural and functional materials.

Traditionally (crystallographic) texture has referred to the statistical distribution of grain orientations in polycrystals, as obtained from X-ray or neutron pole figure measurement and mathematically described by the Orientation Density Function (ODF). But with the availability of spatially resolving techniques such as Kikuchi diffraction in the SEM and TEM as well as synchrotron diffraction with collimated intense beams, the field of texture research is being increasingly extended to other microstructural features such as grain boundaries, interfaces in general and the 3D characterization of microstructure. This widened experimental view has now again great impact on theory of material science. Texture research is so an appealing field not only for metallurgists, mechanical engineers, materials scientists and geologists, but also for physicists, mathematicians and those working in bioscience.

Noticeable advancements in experimental as well as theoretical methods have been made during the last years. It was the purpose of the third conference in this ITAP series to provide a survey on the state of the art in texture analysis as well as to discuss some typical applications. Eight keynote speakers introduced special themes. 89 contributions were presented in three tracks of parallel sessions and in a poster session. The posters were displayed on all three days.

This proceedings volume contains a selection of 49 peer-reviewed papers being written by authors from 15 countries. They have been arranged in four groups in alphabetic order with respect to the first author. In a few cases the authors preferred to fuse their presentations at the conference in one comprehensive paper. The proceedings volume thus may serve as a guide to this challenging field of science.

Holding a scientific conference is a lot of work. We could not have done it without help from many people. First of all our thanks go to the workshop organizers, all the speakers and those who provided manuscripts for publication in these proceedings. Only by their brainwork and their efforts a scientific conference is enabled to be successful and to lead to fruitful discussions and findings. We also want to give a special thanks to the reviewers.

We would like to thank the members of the International Advisory Committee and the Local Organizing Committee, the colleagues inside and outside Göttingen for their tireless support, as well as the University of Göttingen for providing the conference facilities.

Finally, and most importantly, we would like to thank the conference participants – without your work and participation there would be no conference. We hope your stay in Göttingen was an enjoyable and stimulating one.

Helmut Klein and Robert Schwarzer

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