

## Preface

Recrystallization and grain growth, along with phase transformations such as precipitation, are the fundamental phenomena of microstructure evolution taking place during the thermomechanical processing of engineering materials. They are of major scientific interest and of great importance for a wide range of industrial applications. It is therefore quite natural that they should be the object of both intensive research and regular Conferences at an international scale. The 2<sup>nd</sup> International Conference on Recrystallization and Grain Growth follows on from :

- the 1<sup>st</sup> joint Conference on Recrystallization and Grain Growth in Aachen 2001 and
- two series of international meetings on the topics of recrystallization and grain growth, i.e.
  - the International Conferences on Recrystallization and Related Phenomena (Rex'90 at Wollongong, Rex'92 at San Sebastien, Rex'96 at Monterey and Rex'99 at Tsukuba) and
  - the International Conferences on Grain Growth (ICGG) held in Rome (1991), Kitakyushu (1995) and Pittsburgh (1998).

These series of conferences, starting in the early 90's, correspond to a renewed interest in the mechanisms and modelling of recrystallization and grain growth for a variety of reasons. In particular one can cite the advent of new, automatic techniques such as orientation imaging to characterise deformation and recrystallization microstructures and major developments in computer simulations for what are complex physical phenomena. As pointed out many times, the complexity arises from the importance of localised events in highly non-equilibrium states and thereby constitutes a major challenge for the scientific community.

The conferences also coincide with new developments in industrial production of improved 'standard' structural materials and the creation of new materials such as nanomaterials, thin films and interconnects in the microelectronics industries. In both cases it is increasingly important to master the grain sizes and/or orientations by close composition/processing control. This, in a sense, has given a new boost to physical metallurgy in general since recrystallization and grain growth are closely linked to work hardening, dislocation densities and also second phase particle distributions. One of the themes of the present conference is how to cover the entire set of reactions governing recrystallization and grain growth during industrial processing – termed through process modelling. For this reason a significant effort has been made to strengthen the participation of industrial partners via invited conferences etc.

Simultaneously, it is important to improve our understanding of the basic mechanisms taking place during these transformations such as nucleation during recrystallization, grain boundary migration under different forces and boundary interactions with solute atoms and particles. In this area modelling plays a major, but happily not yet an exclusive, role. These fundamental aspects are also treated in detail in these Proceedings. There are also a number papers dealing with new techniques such as laser ultrasonics and high energy X ray methods of characterizing deformation structures, recrystallization and grain growth during (in-situ) heat treatment. The accent is increasingly placed on 3D observations in all types of crystalline solids, i.e. metals, minerals, ceramics and now polymers. It is our sincere hope that the reader will be able to find in these Proceedings an up-to-date set of papers describing current issues, concepts, techniques and results that further our understanding of recrystallization and grain growth.

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