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978-1-107-41325-2 - Superplasticity—Current Status and Future Potential

Edited by Patrick B. Berbon, Min Z. Berbon, Taketo Sakuma and Terence G. Langdon

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Superplasticity—Current Status and Future Potential

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PREFACE

This volume contains papers presented at Symposium HH, "Superplasticity—Current Status and Future Potential," at the 1999 MRS Fall Meeting in Boston, Massachusetts. Superplasticity refers to the ability of a crystalline material to exhibit large strains when pulled in tension. This phenomenon is of academic interest, but it also has a considerable industrial potential because it provides the capability for the forming of complex parts from sheet metals. The only other Materials Research Society symposium dealing exclusively with superplasticity was held at the 1990 MRS Spring Meeting in San Francisco. The proceedings of that symposium were published as Volume 196 in the Materials Research Society symposium proceedings series, and was edited by Merrilea J. Mayo, Masaru Kobayashi, and Jeffrey Wadsworth.

The incentive for organizing the present symposium was the recognition that there have been several significant developments in the field of superplasticity over the last decade. New techniques have recently become available for the production of materials with ultrafine grain sizes, typically in the submicrometer or nanometer range. These materials provide at least the potential for utilizing superplastic forming capabilities at much faster strain rates, and thereby expanding the technology from the current fabrication of low-volume high-value components into high-volume commercial applications. Furthermore, there have been several major advances in the techniques available for microstructural characterization including, for example, the use of high-resolution electron microscopy and computer-aided electron backscatter pattern analysis. Several papers in this symposium describe results obtained using these new procedures.

It is a pleasure to acknowledge the very considerable cooperation we have received from all of the authors participating in this symposium. We are especially grateful to the many authors who assisted in reviewing the papers during the three-day symposium. These reviews were undertaken in an efficient and professional manner, and they resulted in approximately one-half of the papers being returned to the primary authors for at least minor revision of their manuscripts. These revisions were undertaken very promptly with the result that, despite the Christmas holidays and the world-wide excitement of moving into a new millennium, all of the manuscripts were received in a form ready for publication by the first week of January 2000. This remarkable cooperation has resulted in a published proceedings containing all except three of the papers presented in the symposium.

This Meeting attracted papers on all aspects of superplasticity, with individual contributions from ten different countries. Several of the invited speakers came from overseas, and in this respect we are grateful for the financial support provided by the Army Research Office and by the Lawrence Livermore National Laboratory. It is a pleasure also to acknowledge the secretarial assistance provided by Ms. Carolyn Sax in preparing the manuscripts for publication. Finally,

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the success of this Meeting owes much to the dedicated staff of the Materials Research Society, who have provided thorough and speedy responses to our many inquiries during our organization of the symposium.

Patrick B. Berbon
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