

**Properties and Processes at the Nanoscale —
Nanomechanics of Material Behavior**

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Properties and Processes at the Nanoscale — Nanomechanics of Material Behavior

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PREFACE

Symposium SS, “Properties and Processes at the Nanoscale—Nanomechanics of Material Behavior” was held November 28–December 2 at the 2011 MRS Fall Meeting in Boston, Massachusetts.

For two decades, the MRS meetings have had a significant presence in hosting symposia focused on nanomechanical behavior of materials. This symposium continued this strong tradition by focusing on both methods of testing and the resulting unique properties in small volumes of materials. Two main thrusts are evident from the field at this time: the use of small scale tests to examine a locally small structure or defect (i.e., something you cannot accomplish with a macroscopic test) and the use of nanomechanics to determine nm-scale mechanisms that control macroscopic mechanical behavior. This selection of papers from the symposium highlight the breadth of work presented at the symposium. From examining the results of ion irradiation in bulk materials using small scale testing on well characterized volumes to testing thin films of polymer and metals to determining the mechanical response of cells, the work here notes both the successes and challenges in assessing properties and determining the mechanistic processes that dominate the mechanical response of materials on these length scales. We hope that you find this snapshot in time of research in this rapidly developing field as interesting as we have in compiling this volume, and we look forward to continued advances in the future.

David Bahr
Neville Moody
Peter Anderson
Ralph Spolenak

May 2012

ACKNOWLEDGMENTS

The papers published in this volume result from the MRS Fall 2011 Symposium SS. We appreciate all of the oral and the outstanding poster presenters of the symposia who contributed to this proceedings volume. We also thank the reviewers of these manuscripts, who provided valuable feedback to the editors and to the authors. It is an understatement to say that the symposia and the proceedings would not have happened without the organizational help of the Materials Research Society staff.

We would also like to thank the following sponsors of this symposium for their financial support,

Agilent Technologies Inc.
Asylum Research
Hysitron Inc.
Nanomechanics Inc.

Their support enabled us to provide a number of the presenters travel support and financial awards for some of the most outstanding posters presented in the symposium, and helped create a vibrant and lively group of speakers from four continents.

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