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Edited by Oliver Kraft , Klaus W. Schwarz , Shefford P. Baker , L. Ben Freund , Robert Hull  
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**Dislocations and Deformation  
Mechanisms in Thin Films and  
Small Structures**

**MATERIALS RESEARCH SOCIETY  
SYMPOSIUM PROCEEDINGS VOLUME 673**

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# **Dislocations and Deformation Mechanisms in Thin Films and Small Structures**

Symposium held April 17–19, 2001, San Francisco, California, U.S.A.

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## PREFACE

It has been widely recognized that the mechanical properties of small volumes of materials such as thin films and patterned structures (lines, dots) can be very different from the mechanical properties of those same materials in bulk, and a number of MRS symposia have been dedicated to measurement and understanding of those properties. Many explanations of the mechanical behaviors of such small volumes have depended on simplified models of dislocation behavior. However, recent developments in dislocation modeling have made it possible to describe and understand dislocation behavior in much more detail than has previously been possible. Due to the increase in interest and capabilities in this area, this symposium, entitled "Dislocations and Deformation Mechanisms in Thin Films and Small Structures," held April 17–19 at the 2001 MRS Spring Meeting in San Francisco, California, was organized to focus on and discuss the special characteristics of dislocations in small volumes. The symposium was very well attended with 75 presentations from 15 countries divided into 6 oral sessions and 1 poster session. A wide range of topics was presented and discussed including mechanisms of plastic deformation in heteroepitaxial, multilayered, and polycrystalline thin films, as well as in 3D mesostructures such as epitaxial islands, semiconducting devices, and microcrystallites. It was our particular aim to stimulate an exchange between experimental work, theoretical modeling, and numerical simulations.

This volume contains a selection of the papers presented at this symposium. We hope that it will serve as a useful reference on deformation mechanisms and dislocations in thin films, and that it will stimulate new ideas and research in this exciting area of science and technology.

Oliver Kraft  
Klaus W. Schwarz  
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The efforts and generosity of these individuals has helped to enhance our state of knowledge in this scientifically interesting and technologically critical area.

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