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Materials Modification and Growth Using Ion Beams

Editors: Ursula Gibson, Alice E. White and Peter P. Pronko

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## Preface

This volume contains a large percentage of the papers that were presented at the symposium on Materials Modification and Growth Using Ion Beams held April 21-23, 1987 as part of the Spring MRS Meeting in Anaheim, CA. Our goal in organizing this symposium was to bring together investigators of low, intermediate, and high energy ion-activated processes for materials modification.

Tuesday's sessions were devoted to "fundamental beam-solid interactions" which ranged from the intriguing observation of a Ge layer forming behind the oxidation front in Ge-implanted silicon to studies of ion-beam-enhanced grain growth. A wide range of subjects were presented at the poster session, including late breaking news about strain measurements on ion-implanted Si and a new technique for projection ion beam lithography which takes advantage of the differences in optical reflectivity between amorphous and crystalline silicon.

Wednesday morning was devoted to a lively and well-attended session on Silicon on Insulator (SOI) by high dose ion implantation. Of particular interest was the confirmation of the presence of oxygen "bubbles" in silicon samples which had experienced a high dose rate implantation of oxygen. This was a subject of some controversy at Symposium A of the Fall 1986 MRS Meeting. Both afternoon sessions involved ion mixing: the first was limited to mixing of semiconductor superlattices, while the second covered general ion beam mixing for compound and alloy formation.

Thursday's sessions focused on the use of ion beams in the production of various types of coatings, particularly those for optical and tribological applications. Some of the processes described used much lower energies than conventional implantation, but achieved comparable changes in stoichiometry since the beam was used during the growth of the materials by vapor deposition. Various theoretical models for the effect of thin film structure of these low energy processes were also discussed along with corrosion and wear reduction properties of a number of materials.

The papers in this volume are arranged in the order in which they were presented, except for the poster session, which is placed last. The index uses selected keywords to direct the reader to appropriate manuscripts rather than specific pages. The keywords, along with the session titles, are intended as a general guide for the reader, rather than a complete index.

Ursula Gibson  
Alice E. White  
Peter Pronko

June 28, 1987

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Corporate and government sponsors essential in assuring the quality of the session include Air Force Office of Scientific Research, AT&T Bell Laboratories, DARPA/Office of Naval Research, Eaton Corporation, General Ionex Corporation, Ion Tech, Inc., National Electrostatics, and Optical Coating Laboratory, Inc.

Special thanks are due to Mary Eskes at the University of Arizona for coordinating the assembly of the final manuscripts, to Henrietta Weston and Ken Short of AT&T Bell Laboratories, and to Marty Barker at Universal Energy Systems. The staff at the Materials Research Society is also gratefully acknowledged.