Materials in Space—Science, Technology and Exploration

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Materials in Space—Science, Technology and Exploration

Symposium held November 29-December 2, 1998, Boston, Massachusetts, U.S.A.

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CONTENTS

*Invited Paper

*Invited Paper

PART V: MICROGRAVITY MATERIALS PROCESSING: FUNDAMENTAL STUDIES

PART VI: MICROGRAVITY MATERIALS PROCESSING: FLIGHT EXPERIMENTS

*Invited Paper

PART VII: MATERIALS FOR SPACE AND OTHER HOSTILE ENVIRONMENTS

PREFACE

This volume contains 36 papers from the symposium entitled "Materials in Space—Science, Technology and Exploration," held over three days at the 1998 MRS Fall Meeting in Boston, Massachusetts. This symposium was held to commemorate the 40th anniversary of the National Aeronautics and Space Administration; it was also the 25th anniversary of the Materials Research Society. This volume is organized into seven topical areas that follow the organization of the symposium when feasible, but deviate to include contributions from a number of excellent poster presentations (the poster presented by Dr. S. Kishimoto entitled "Development of Metallic Closed Cellular Materials Containing Polymers" captured the spirit of the symposium and a poster award) and to reflect the main themes of the symposium. The symposium began with an excellent plenary session that explored important issues of materials in space. Papers from this session included international efforts related to microgravity materials science and materials for protection of astronauts from space radiation, and are the lead articles in Parts I, V, and VII. Monday afternoon focused on Mars Pathfinder mission results, and materials and technologies for space exploration; these papers round out Part I on space exploration.

Part II focuses on space photovoltaics and presents several contributions from a session on space photovoltaic materials technology, as well as closely related poster presentations. Part III on materials for energy conversion and storage represents contributed and invited presentations from three different symposium sessions. Fundamental studies occupied Tuesday morning, including a session on quantum effects on materials and devices and fundamental studies of microgravity materials science. These two sessions and related poster presentations are included in Parts IV and V, respectively. Wednesday morning was an all-invited session that focused on results of space shuttle microgravity materials science experiments, and included excellent presentations from across the nation; Part VI includes five of the six papers presented in that session. The final section of the proceedings examined materials for space and other hostile environments and represents a cross-section of symposium sessions. The symposium ended with two special events that are not captured in the proceedings. The first event was a panel discussion with many of the participants from the plenary session on Monday morning. The discussion focused on the user microgravity community and the NASA/International Microgravity Materials Science interface. The second event was a keynote session featuring Payload Specialist Albert Sacco (STS-73, USML-2). The focus of the keynote address, involving lively feedback from the audience, was the relationship between payload and mission specialists and performing and analyzing results of materials research in space. In conclusion, the topic of this symposium, like the format of the final sessions, was very positively received, and should be revisited at future meetings.

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Joseph M. Prahl
Theo G. Keith
Sheila G. Bailey
J. Robert Fowler

October 1999

ACKNOWLEDGMENTS

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Invited Speakers, Panel Members, Sponsors, and Session Chairs

J. Barry Andrews, University of Alabama, Birmingham
Joseph H. Armstrong, Global Solar Energy LLC
Bruce A. Banks, NASA Glenn Research Center
Arnon Chait, NASA Glenn Research Center
Donald L. Chubb, NASA Glenn Research Center
Navid S. Fatemi, Essential Research, Inc.
Dale Ferguson, NASA Glenn Research Center
Dennis J. Flood, NASA Glenn Research Center
Donald O. Frazier, NASA Marshall Space Flight Center
M.E. Glicksman, Rensselaer Polytechnic Institute
Brian S. Good, NASA Glenn Research Center
Donald Henderson, Fisk University
Rodney Herring, Canadian Space Agency
Richard W. Hoffman, Ohio Aerospace Institute
William L. Johnson, California Institute of Technology
David Kaplan, NASA Johnson Space Center
Fred J. Kohl, NASA Glenn Research Center
Clifford P. Kubiak, University of California, San Diego
Prashant Kumta, Carnegie Mellon University
Geoffrey A. Landis, Ohio Aerospace Institute
Alex Lehoczky, NASA Marshall Space Flight Center
Douglas M. Matson, Massachusetts Institute of Technology
Philip Mestecky, Elsevier Science Ltd.
Steve Ringel, Ohio State University
Albert Sacco, Jr., Northeastern University
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