

**TRANSACTIONS OF
THE MATERIALS RESEARCH SOCIETY OF JAPAN**

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JAPAN**

Executive Editors

**SHIGEYUKI SŌMIYA
MASAO DOYAMA
MASAKI HASEGAWA
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Senior Editors

Advanced Materials	MASAO DOYAMA SHIGEYUKI SŌMIYA MASAKI HASEGAWA
Zirconia and Zircon Ceramics	SHIGEYUKI SŌMIYA
Hydrothermal Reactions	SHIGEYUKI SŌMIYA

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ELSEVIER APPLIED SCIENCE
LONDON and NEW YORK

ELSEVIER SCIENCE PUBLISHERS LTD
Crown House, Linton Road, Barking, Essex IG11 8JU, England

Sole distributor in the USA and Canada
ELSEVIER SCIENCE PUBLISHING CO., INC.
655 Avenue of the Americas, New York, NY 10010, USA

WITH 42 TABLES AND 221 ILLUSTRATIONS

© 1990 ELSEVIER SCIENCE PUBLISHERS LTD

Softcover reprint of the hardcover 1st edition 1990

British Library Cataloguing in Publication Data

Transactions (Materials Research Society of Japan)
Transactions.—Vol. 1 (1990)—
1. Materials
I. Materials Research Society of Japan
620.11

ISBN-13:978-94-010-6842-0

e-ISBN-13:978-94-009-0789-8

DOI:10.1007/978-94-009-0789-8

Library of Congress Cataloging-in-Publication Data

Transactions of the Materials Research Society of Japan
edited by Shigeyuki Sōmiya, Masao Doyama, Masaki Hasegawa,
Yoshitaka Agata
p. cm.
Includes bibliographical references.

1. Materials—Congresses. I. Sōmiya, Shigeyuki. II. Dōyama.
Masao, 1927– . III. Hasegawa, Masaki. IV. Agata, Yoshitaka
TA401.3.A33 1990
620.1'1—dc20 90—49397

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To Professor Emeritus Yunoshin Imai

for his encouragement in the establishment and promotion of mutual international understanding and the exchange of ideas.

Preface

The Materials Research Society of Japan (MRS-Japan), formerly the Advanced Materials Science and Engineering Society (AMSES), was established on 16 March 1989 in Tokyo, Japan. AMSES was established following the International Conference on Advanced Materials, held from 30 May to 3 June 1988 in Tokyo (*MRS Bulletin*, October and November 1988). This meeting was similar to the MRS meeting held in Boston, USA, and consisted of 21 symposia, which were published as proceedings in 14 volumes. The number of participants was over 1600.

The first President of AMSES, Professor Masao Doyama, gave the following address:

As advanced technology develops toward its highest goals, a small improvement in existing materials is not enough to meet the demands. The deadlock of advanced technology often brings the invention of new materials.

Human civilization has grown along with materials. The Stone Age, the Bronze Age, and the Iron Age represent the materials most used in those times. Since the beginning of the 20th century, the plastic age, the semiconductor age, the new ceramics age, and the composite materials age have been identified, but no single material dominates.

In addition to the traditional classification of materials (the warp) such as metals, semiconductors, ceramics and organic materials, materials have to be studied by the woof. After World War II, metallurgy hit a deadlock. To overcome the deadlock, metallurgy changed to materials science, absorbing the knowledge of physics, chemistry, chemical engineering, electrical engineering, mechanical engineering, civil engineering, etc., and collaborating with ceramics, semiconductors, and organic materials.

This movement was not successful in Japan because at that time the production of iron and steel in Japan was increasing very rapidly, and the country could not spare a sidelong glance at other fields. Now the iron and steel industry in Japan has reached maturity, and the value of materials science is being rediscovered in Japan. In organic materials, the properties of single molecules reflect those of the entire product. Synthesis is emphasized. Fracture can be treated by itself or in comparison among metals, semiconductors, ceramics and organic, rheology and amorphous materials. The complexity of the problem cannot be adequately addressed by traditional societies.

Process, properties, structure, and environment are the four elements of materials. Without good processes, good materials cannot be made. In the future, the develop-

ment of materials must be made from a broad perspective and must be useful for mankind.

The Materials Research Society, begun in the United States, has grown rapidly with the strategy of materials science and flexibility. The MRS International Conference on Advanced Materials held in Tokyo, Japan drew 1600 participants and proved a great success. The Advanced Materials Science and Engineering Society of Japan was established by the kind invitation of MRS President R.P.H. Chang through the collaboration of Professor Sōmiya and Dr K. Inoue. This Society is an international society holding a strong connection with MRS.

On the occasion of the founding of the Advanced Materials Science and Engineering Society, we respectfully request your guidance and warm support.

MRS Bulletin 15(6) (1989) 29

The International Materials Research Committee was established in September 1989 and AMSES was recognized as one of the founding societies of this Committee world-wide and also as the only society in Japan in November 1989. Since then, many societies related to materials have changed their names and used the abbreviation MRS. The Executive Editors therefore thought it preferable to change the name from AMSES to MRS-Japan, the Materials Research Society of Japan.

It is easier to say MRS-Japan than AMSES, especially in Japanese, and the name MRS is more widespread than AMSES. It was therefore decided to change the name before the publication of these transactions of the Materials Research Society of Japan.

This volume includes the following symposia:

1. Short course by Dr. M.V. Swain
(8 November 1988, Tokyo)
Chair: S. Sōmiya
2. Lecture Meeting on Advanced Materials 'Zirconia Ceramics'
(6 December 1988, Tokyo)
Chair: S. Sōmiya
3. Lecture Meeting on Advanced Materials
'Crystal Growth'
(5 September 1989, Tokyo)
Chair: S. Sōmiya
4. Lecture Meeting on Hydrothermal Reactions
(16 November 1989, Tokyo)
Chair: S. Sōmiya
5. Annual Symposium on Advanced Materials
(14–15 December 1989, Kanagawa)
Chair: M. Doyama, S. Sōmiya and M. Hasegawa

Many papers arrived after their deadline or were not written in English. Some will

appear in the next volume of the Transactions of the Materials Research Society of Japan.

The papers in this volume reflect the phases of advanced materials. After looking at these papers, we are able to understand the knowledge and level of science and technology in the field of advanced materials. Understanding is the first step in promoting R & D.

We are convinced that this volume will promote understanding and the development of materials science and engineering, as well as promoting international communication among the scientists, engineers, researchers, students, etc, who are involved with materials.

Executive Editors
Shigeyuki Sōmiya (Chief)
Masao Doyama
Masaki Hasegawa
Yoshitaka Agata

Acknowledgements

These Transactions of the Materials Research Society of Japan include the following Symposia. The Editor in Chief expresses his appreciation to the Symposium chairs, without whose efforts the symposia could not have been organised.

1. Short Course by M.V. Swain
Shigeyuki Sōmiya
2. Zirconia Ceramics
Shigeyuki Sōmiya
3. Zircon
Shigeyuki Sōmiya
4. Hydrothermal Reactions
Shigeyuki Sōmiya
5. Advanced Materials
Masao Doyama
Shigeyuki Sōmiya
Masaki Hasegawa

Support for travel and living expenses for researchers from Australia, China, Korea, Taiwan and Sri Lanka was provided by the Sōmiya Foundation (Tentative), and from the USA and Europe by contributions to Teikyo University from the following companies:

Chichibu Cement Co. Ltd
JEOL Co.
Nippon Soda Co. Ltd
Onoda Cement Co. Ltd
Toshiba Ceramics Co. Ltd

to all of whom I am most grateful.

The secretarial work of the Society was carried out by Mr Yoshitaka Agata, KSP Co., and his colleagues. I wish to say thank you to them, to Rigaka Co. for

supporting accommodation expenses, and to all symposium chairs, session chairs, participants and seminar editors.

Shigeyuki Sōmiya
Editor-in-Chief
Transactions of the
Materials Research
Society of Japan

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