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978-1-107-40975-0 - Synthesis and Processing of Ceramics: Scientific Issues:

Materials Research Society Symposium Proceedings: Volume 249

Editors: Wendell E. Rhine, Thomas M. Shaw, Robert J. Gottschall and Yok Chen

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Synthesis and Processing of Ceramics: Scientific Issues

Symposium held December 2-6, 1991, Boston, Massachusetts, U.S.A.

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Preface

The symposium entitled Synthesis and Processing of Ceramics: Scientific Issues, was held in Boston, Massachusetts, December 2-6, 1991, at the 1991 Fall Meeting of the Materials Research Society, and was co-sponsored by the American Ceramic Society. This is the first time this particular symposium has been held, but it is related to previous symposia which have been held on the synthesis and processing of ceramics. The symposium was financially supported by the Office of Naval Research, Martin Marietta Energy Systems, and Corning.

The purpose of this symposium was to provide a forum in which scientists and engineers from a diversity of backgrounds could discuss the scientific issues involved in synthesizing and processing ceramic materials. The synthesis of ceramics has progressed to the point that many chemically derived powders and fibers are commercially available, but synthesizing and converting the precursors to ceramic materials with the desired composition and properties is still more an art than a science.

Although powders with reproducible physical and chemical properties are now available, developing reliable processing routes to produce flaw free ceramics still remains a critical issue which limits applications for advanced ceramic materials. Processing methods have improved as the scientific underpinnings have been elucidated, but many problems remain. Improved processing approaches, new characterization techniques, and a better understanding of the scientific issues are needed to extend applications for ceramic materials.

In the original symposium, papers that addressed the above issues were presented in ten sessions. However, for this proceedings, the papers have been reorganized into nine parts so that papers discussing the synthesis of ceramics are in the first three parts. The next four parts contain papers that discuss the scientific issues involved in processing ceramics, and the last two parts contain papers which deal with a combination of processing and synthesis issues.

The research reported in this proceedings provides a useful resource for those who are interested in the synthesis and processing of ceramic materials. The papers included in the proceedings reflect the current interests of researchers in this field and indicate that progress is being made in understanding the scientific issues involved in the synthesis and processing of ceramics.

One hundred nine abstracts were received and presented in invited, oral, and poster presentations. Seventy-nine of the papers are presented in this proceedings. All of the papers were subjected to peer review. After the authors responded to the referees' comments and made any corrections, the papers were accepted without further review or editing.

Wendell E. Rhine
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The symposium organizers wish to express their appreciation to all symposium contributors, and we express special appreciation to those authors who contributed papers to the proceedings. The response to the Call for Papers was gratifying, since the symposium successfully covered the current major research topics concerning the synthesis and processing of ceramics.

We also wish to thank Dietmar Seyferth, Leonard Interrante, William Rees, Jr., Rustum Roy, Roger Horn, Matthew Tirrell, Fred Lange, Michael Cima, Lynn Boatner, George Scherer, Paul Calvert, Martin Harmer, Richard Page, Michael Sacks, John Haggerty, and Emmanuel Giannelis who served as invited speakers and/or session chairs and contributed greatly to the overall success of the symposium.

The help of Barbara Layne, of the Ceramics Processing Research Laboratory of the Massachusetts Institute of Technology, and Phyllis E. Steele in preparing this manuscript is gratefully acknowledged. We also express our appreciation to the entire staff of the Materials Research Society for their assistance in organizing the symposium and publishing this proceedings.

Finally, the organizers thank the American Ceramic Society for co-sponsoring this symposium and gratefully acknowledge financial support from the Office of Naval Research, Martin Marietta Energy Systems, and Corning.

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