

High-Temperature Superconductor Materials, Devices, and Applications

Edited by

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*Proceedings of the 106th Annual Meeting
of The American Ceramic Society,
Indianapolis, Indiana, USA (2004)*

High-Temperature Superconductor Materials, Devices, and Applications

Technical Resources

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Preface

Major advances have been made in the last seventeen years in high-temperature superconductor (HTS) research, resulting in increasing use of HTS materials in commercial and pre-commercial applications. These materials have in common the complexity of their multi-component chemistry. Consequently it is not surprising that many aspects of the interplay between microscopic structure, macroscopic properties, and processing are still not fully understood. This symposium investigated the relationship between features at atomic level such as oxygen vacancies, stacking faults and site order/disorder, grain boundaries, film-substrate interactions, buffer-superconductor interactions, thermodynamic, transport, and other macroscopic properties. Phase diagrams, which are based on the relevant crystal chemistry, serve as a framework for interpreting microscopic/macroscopic interactions. The focus of this symposium was on the integration of crystal chemistry, phase equilibria and thermodynamics of high T_c materials in bulk, thin film and single crystal forms. This symposium also focused on key materials and processing developments in both MgB_2 and YBCO conductors that promise to broaden the commercial applications of HTS wire and thin film technology. The development of second-generation YBCO coated conductors continues to show the steady improvement toward the long-length processing capabilities. This symposium also covered fundamental material properties studies, new growth methods, device and materials integration research, and developments in designing and growing new materials, all involving epitaxial superconducting thin films.

This volume contains proceedings of the papers presented at the High-Temperature Superconductor Materials, Devices and Applications Symposium during the 106th Annual Meeting of the American Ceramic Society (ACerS), April 18-21, 2004 in Indianapolis, Indiana. This symposium was well supported with 42 papers presented. One poster session was well attended and provided a dynamic forum for discussions of many of the issues raised during the meeting. This symposium provided overviews of the Long Length Processing of YBCO Coated Conductors, Bulk Processing and Flux Pinning, In-situ Diagnostics and Reel to-Reel Characterizations, Crystal Chemistry and Non-YBCO Materials, Biaxially Textured Templates (RABiTS, IBAD, and ISD), New Developments in Buffer Layer Technology. This volume is divided into three sections: (1) YBCO coated conductors, (2) Buffer layers, and (3) Bulk superconductors. The order in which the papers appear in this volume and the division into which they are organized may be different from that of the presentations at the meeting. It is hoped that this comprehensive volume will be a good summary of the latest developments in high-temperature superconductor research.

We acknowledge the service provided by the session chairs and appreciate the valuable assistance from the ACerS programming coordinators. We are also in debt to Greg Geiger for his involvement in editing and producing this book. Special thanks are due to the speakers, authors, manuscript reviewers, and ACerS officials for their contributions. The financial support of this meeting was provided by Electronics Division.

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YBCO Coated Conductors
