

MRS SYMPOSIUM PROCEEDINGS

Volume 1492 • 2012 MRS Fall Meeting

Materials for Sustainable Development—Challenges and Opportunities

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MRS MATERIALS RESEARCH SOCIETY
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Materials for Sustainable Development —Challenges and Opportunities

MATERIALS RESEARCH SOCIETY
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Materials for Sustainable Development—Challenges and Opportunities

Symposium held November 25–30, 2012, Boston, Massachusetts, U.S.A.

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PREFACE

Symposium D, “Energy Critical Materials” and Symposium G, “Materials as Tools for Sustainability,” were held on November 25–30 at the 2012 MRS Fall Meeting in Boston, Massachusetts.

Many technologies that currently impart significant benefits to our society cannot continue indefinitely without depleting or despoiling key resources, and more sustainable paths must be sought. Sustainable development that raises global standards of living and promotes economic growth calls for materials science to develop advanced technologies and strategies to use our finite material and energy resources more efficiently to minimize impact on environment and human health. As an example, both clean and traditional energy technologies have critical dependencies on specific elements. Therefore, challenges in the supply of these critical materials could directly affect the adoption of new technologies and ultimately threaten energy security. This symposium proceedings volume presents a compilation of emerging research on sustainable development in the context of product manufacturing, catalysis, transportation, and energy-critical materials. The papers are divided into six sections: (1) Energy Storage, (2) Rare Earths and Magnets, (3) Materials Resources, (4) Smart Materials, (5) Environment and Health, (6) Efficiency and Fuel Switching. Each paper in this volume provides a glimpse of the exciting recent developments occurring in several aspects of sustainability, including: critical elements for next-generation batteries, phase change materials for energy efficient buildings, weathering resistant materials, 3-D printing technologies, flame retardants with reduced toxicity, and stimulating life-cycle analysis examples in various applications. We hope these papers convey the breadth of exciting advancements happening in the area of sustainability including critical elements for energy.

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