

## CONTENTS

Preface .....	ix
Acknowledgments.....	xi
Materials Research Society Symposium Proceedings.....	xiii

### ***THEORY, MODELING AND SIMULATION***

* Multiscale Approach to Theoretical Simulations of Materials for Nuclear Energy Applications: Fe-Cr and Zr-based Alloys.....	3
Igor A. Abrikosov, Alena V. Ponomareva, Svetlana A. Barannikova, Olle Hellman, Olga Yu. Vekilova, Sergei I. Simak, and Andrei V. Ruban	
Simulating Radiation-induced Defect Formation in Pyrochlores .....	15
David S.D. Gunn, John A. Purton, and Ilian T. Todorov	
Helium Bubbles in Fe: Equilibrium Configurations and Modification by Radiation.....	21
Xiao Gai, Roger Smith, and Steven Kenny	
Atomistic Ordering in Body Centered Cubic Uranium-Zirconium Alloy.....	27
Alex P. Moore, Ben Beeler, Michael Baskes, Maria Okuniewski, and Chaitanya S. Deo	
Cascade Overlap in <i>hcp</i> Zirconium: Defect Accumulation and Microstructure Evolution with Radiation using Molecular Dynamics Simulations.....	37
Prithwish K. Nandi and Jacob Eapen	
Role of CSL Boundaries on Displacement Cascades in $\beta$ -SiC .....	43
Prithwish K. Nandi, V. Ajay Annamareddy, and Jacob Eapen	

\*Invited Paper

* An Attempt to Handle the Nanopatterning of Materials Created Under Ion Beam Mixing . . . . .	49
D. Simeone, G. Baldinozzi, D. Gosset, G. Demange, Y. Zhang, and L. Luneville	

## RADIATION EFFECTS

Nanostructuration of Cr/Si Layers Induced by Ion Beam Mixing . . . . .	61
L. Luneville, L. Largeau, C. Deranlot, N. Moncoffre, Y. Serruys, F. Ott, G. Baldinozzi, and D. Simeone	
Radiation Damages on Mesoporous Silica Thin Films and Bulk Materials . . . . .	69
X. Deschanel, S. Dourdain, C. Rey, G. Toquer, A. Grandjean, S. Pellet-Rostaing, O. Dugne, C. Grygiel, F. Duval, and Y. Serruys	
Surface Sensitive Spectroscopy Study of Ion Beam Irradiation Induced Structural Modifications in Borosilicate Glasses . . . . .	75
Amy S. Gandy, Martin C. Stennett, and Neil C. Hyatt	
Titanium and Zirconium Oxidation under Argon Irradiation in the Low MeV Range . . . . .	81
Dominique Gorse-Pomonti, Ngoc-Long Do, Nicolas Bérard, Nathalie Moncoffre, and Gianguido Baldinozzi	
Irradiation Induced Effects at Interfaces in a Nanocrystalline Ceria Thin Film on a Si Substrate . . . . .	87
Philip D. Edmondson, Neil P. Young, Chad M. Parish, Fereydoon Namavar, William J. Weber, and Yanwen Zhang	
Atomistic Observation of Electron Irradiation-induced Defects in CeO <sub>2</sub> . . . . .	93
Seiya Takaki, Tomokazu Yamamoto, Masanori Kutsuwada, Kazuhiro Yasuda, and Syo Matsumura	
Effect of Alloy Composition & Helium Ion-irradiation on the Mechanical Properties of Tungsten, Tungsten-tantalum & Tungsten-rhenium for Fusion Power Applications . . . . .	99
Christian E. Beck, Steve G. Roberts, Philip D. Edmondson, and David E.J. Armstrong	

\*Invited Paper

## *SYNTHESIS, CHARACTERIZATION AND THERMOMECHANICAL PROPERTIES*

* Atom-probe Tomography of Surface Oxides and Oxidized Grain Boundaries in Alloys from Nuclear Reactors . . . . .	107
Karen Kruska, David W. Saxe, Takumi Terachi, Takuyo Yamada, Peter Chou, Olivier Calonne, Lionel Fournier, George D.W. Smith, and Sergio Lozano-Perez	
Micromechanical Testing of Oxidised Grain Boundaries in Ni Alloy 600 . . . . .	119
Alisa Stratulat and Steve G. Roberts	
Elastic Strains in Polycrystalline UO <sub>2</sub> Samples Implanted with He: Micro Laue Diffraction Measurements and Elastic Modeling . . . . .	125
Axel Richard, Etienne Castelier, Herve Palancher, Jean-Sebastien Micha, and Philippe Goudeau	
Effect of High Temperature Heat Treatment on The Microstructure and Mechanical Properties of Third Generation SiC Fibers . . . . .	131
Dominique Gosset, Aurélien Jankowiak, Thierry Vandenbergh, Maud Maxel, Christian Colin, Nicolas Lochet, and Laurence Luneville	
Characterization and Thermomechanical Properties of Ln <sub>2</sub> Zr <sub>2</sub> O <sub>7</sub> (Ln=La, Pr, Nd, Eu, Gd, Dy) and Nd <sub>2</sub> Ce <sub>2</sub> O <sub>7</sub> . . . . .	139
Toshiaki Kawano, Hiroaki Muta, Masayoshi Uno, Yuji Ohishi, Ken Kurosaki, and Shinsuke Yamanaka	
High Temperature 2-D Millimeter-wave Radiometry of Micro Grooved Nuclear Graphite . . . . .	145
Paul P. Woskov and S.K. Sundaram	
Reduction of Gd <sub>6</sub> UO <sub>12</sub> for the Synthesis of Gd <sub>6</sub> UO <sub>11</sub> . . . . .	151
Dario Pieck, Lionel Desgranges, Yves Pontillon, and Pierre Matheron	
Author Index . . . . .	157
Subject Index . . . . .	159

\*Invited Paper