

Cambridge University Press

978-1-107-40814-2 - Scientific Basis for Nuclear Waste Management XXXIII:

Materials Research Society Symposium Proceedings: Volume 1193

Editors: Boris E. Burakov and Albert S. Aloy

Frontmatter

[More information](#)

**Scientific Basis for Nuclear
Waste Management XXXIII**

Cambridge University Press

978-1-107-40814-2 - Scientific Basis for Nuclear Waste Management XXXIII:

Materials Research Society Symposium Proceedings: Volume 1193

Editors: Boris E. Burakov and Albert S. Aloy

Frontmatter

[More information](#)

Cambridge University Press

978-1-107-40814-2 - Scientific Basis for Nuclear Waste Management XXXIII:

Materials Research Society Symposium Proceedings: Volume 1193

Editors: Boris E. Burakov and Albert S. Aloy

Frontmatter

[More information](#)

**MATERIALS RESEARCH SOCIETY
SYMPOSIUM PROCEEDINGS VOLUME 1193**

Scientific Basis for Nuclear Waste Management XXXIII

Symposium held May 24–29, 2009, St. Petersburg, Russia

EDITORS:

Boris E. Burakov

V.G. Khlopin Radium Institute
St. Petersburg, Russia

Albert S. Aloy

V.G. Khlopin Radium Institute
St. Petersburg, Russia



Materials Research Society
Warrendale, Pennsylvania

Cambridge University Press

978-1-107-40814-2 - Scientific Basis for Nuclear Waste Management XXXIII:

Materials Research Society Symposium Proceedings: Volume 1193

Editors: Boris E. Burakov and Albert S. Aloy

Frontmatter

[More information](#)

CAMBRIDGE UNIVERSITY PRESS

Cambridge, New York, Melbourne, Madrid, Cape Town,

Singapore, São Paulo, Delhi, Mexico City

Cambridge University Press

32 Avenue of the Americas, New York NY 10013-2473, USA

Published in the United States of America by Cambridge University Press, New York

www.cambridge.org

Information on this title: www.cambridge.org/9781107408142

Materials Research Society

506 Keystone Drive, Warrendale, PA 15086

<http://www.mrs.org>

© Materials Research Society 2009

This publication is in copyright. Subject to statutory exception
and to the provisions of relevant collective licensing agreements,
no reproduction of any part may take place without the written
permission of Cambridge University Press.

This publication has been registered with Copyright Clearance Center, Inc.
For further information please contact the Copyright Clearance Center,
Salem, Massachusetts.

First published 2009

First paperback edition 2012

Single article reprints from this publication are available through
University Microfilms Inc., 300 North Zeeb Road, Ann Arbor, MI 48106

CODEN: MRSPDH

ISBN 978-1-107-40814-2 Paperback

Cambridge University Press has no responsibility for the persistence or
accuracy of URLs for external or third-party internet websites referred to in
this publication, and does not guarantee that any content on such websites is,
or will remain, accurate or appropriate.

Cambridge University Press

978-1-107-40814-2 - Scientific Basis for Nuclear Waste Management XXXIII:

Materials Research Society Symposium Proceedings: Volume 1193

Editors: Boris E. Burakov and Albert S. Aloy

Frontmatter

[More information](#)

CONTENTS

Preface	xvii
----------------------	------

Materials Research Society Symposium Proceedings.....	xviii
--	-------

ADVANCED MATERIALS

Durable Self-Glowing Crystals as Advanced Materials for Actinide Immobilization.....	3
Boris E. Burakov, Maria V. Zamoryanskaya, and Yana V. Domracheva	
Irradiation Effects of Synthetic Coffinite (USiO_4) Studied by In Situ TEM	9
J.M. Zhang, F.Y. Lu, V. Pointeau, F.X. Zhang, M. Lang, C. Poinssot, J. Lian, and R.C. Ewing	
Cathodoluminescence of Actinides in Wide Gap Materials	15
Maria V. Zamoryanskaya, Yana V. Domracheva, Alexander N. Trofimov, and Boris E. Burakov	
Treatment of Graphite Waste to Minimize Disposal Volume.....	23
Willie C.M.H. Meyer, I.J. van der Walt, Vusi Kabilia, Jacoba J. Badenhorst, Danie Moolman, and Wouter Klopper	
Inorganic Matrices for Immobilization of Tc-99.....	33
Yulia I. Korneyko, Vladimir M. Garbuzov, Olga V. Schmidt, and Boris E. Burakov	
Application of Track Membranes for Additional Treatment of Water Coolant of Nuclear Reactor	39
U.S. Salihbaev, A.A. Kist, Sh. R. Malikov, V.P. Pikul, R.I. Radyuk, G.A. Radyuk, E.A. Danilova, and N.M. Muhamedshina	
Experiments Performed in Substantiation of the Conditioning of BN-350 Spent Cesium Traps Using Lead or Lead-Bismuth Alloy Filling Technology	45
O.G. Romanenko, I.L. Tazhibaeva, I.L. Yakovlev, A.I. Ivanov, D. Wells, A. Herrick, J.A. Michelbacher, and S.B. Shiganakov	

Cambridge University Press

978-1-107-40814-2 - Scientific Basis for Nuclear Waste Management XXXIII:

Materials Research Society Symposium Proceedings: Volume 1193

Editors: Boris E. Burakov and Albert S. Aloy

Frontmatter

[More information](#)**CERAMIC WASTE FORMS**

Radiation Damage in Materials — Effects of Disorder	55
Karl R. Whittle, Mark G. Blackford, Gregory R. Lumpkin, Katherine L. Smith, and Nestor J. Zaluzec	
Ceramic Formulation and Processing Design for Plutonium Disposition	61
Neil C. Hyatt, Martin Stennett, Andreas Jenni, Daniel Reid, and Ewan R. Maddrell	
Heavy Ion Implantation Combined with Grazing Incidence X-ray Absorption Spectroscopy (GIXAS): A New Methodology for the Characterization of Radiation Damage in Nuclear Ceramics	67
Martin C. Stennett, Neil C. Hyatt, Daniel P. Reid, Ewan R. Maddrell, Nianhua Peng, Chris Jeynes, Karen J. Kirkby, Joseph C. Woicik, and Bruce Ravel	
Synthesis and Characterization of Sodalite as Matrix for Conditioning Chloride Spent Salts From Pyroprocesses.....	73
G. De Angelis, I. Bardez-Giboire, M. Mariani, M. Capone, M. Chartier, and E. Macerata	
The Relative Merits of Oxides of Hafnium, Cerium and Thorium as Surrogates for Plutonium Oxide in Calcium Phosphate Ceramics	79
B.L. Metcalfe, S.K. Fong, L.A. Gerrard, I.W. Donald, E.S. Welch, M.C. Stennett, and N.C. Hyatt	
Solid-Phase Transformation of Cs⁺- and Sr²⁺-Bearing Zeolite Sorbents Derived From Cenospheres to Mineral-Like Forms	87
Sergei N. Vereshchagin, Tatiana A. Vereshchagina, Leonid A. Solovyov, Nina N. Shishkina, Nataly G. Vasilieva, and Alexander G. Anshits	
Immobilization of Radioactive Isotopes in Fluorapatite Matrices	95
Elena Macerata, Piergiuseppe Innocente, Mario Mariani, and Michele Galletta	

Cambridge University Press

978-1-107-40814-2 - Scientific Basis for Nuclear Waste Management XXXIII:

Materials Research Society Symposium Proceedings: Volume 1193

Editors: Boris E. Burakov and Albert S. Aloy

Frontmatter

[More information](#)***GEOLOGICAL DISPOSAL***

The Methodology Followed in Belgium to Investigate the Compatibility with Geological Disposal of Eurobitum Bituminized Intermediate-Level Radioactive Waste	105
Elie Valcke, An Marien, and Maarten Van Geet	
Impact of Advanced Fuel Cycles on Geological Disposal.....	117
Jan Marivoet and Eef Weetjens	
Materials Aspects of Advanced Repository Concepts for Higher Toxicity Waste.....	127
Ian G. McKinley and Ellie M. Scourse	
Wireless Transmission Monitoring in a Geological Disposal Repository: (I) Concepts and Advantages.....	135
Yasuhiro Suyama, Hisashi Takamura, Kazuhiro Aoki, Ryutaro Wada, Hiroshi Shimbo, and Kazuo Okutsu	
Wireless Transmission Monitoring in a Geological Disposal Repository: (II) Research and Development	143
Hisashi Takamura, Hiroshi Shimbo, Kazuo Okutsu, Yasuhiro Suyama, Kazuhiko Aoki, and Ryutaro Wada	
The Development of Sprayed Backfill Technology	151
Pacovsky Jaroslav, Svoboda Jiří, and Št'astka Jiří	
Studies on Radionuclide Transport Behavior — The Next Generation of In Situ Experiments at the Grimsel Test Site	159
Andrew James Martin and Ingo Blechschmidt	
Mineralogical Control of the REE Distribution in the Fracture Fillings of an Uranium-Ore (Caceres, Spain).....	169
Belen Buil, Paloma Gomez, Maria Jesus Turrero, and Antonio Garralon	
Disruptive Effects on a HLW Repository Due to Uplift-Erosion in the Distant Future	177
Kaname Miyahara, Manabu Inagaki, Makoto Kawamura, Takanori Ebina, and Ian G. McKinley	

Cambridge University Press

978-1-107-40814-2 - Scientific Basis for Nuclear Waste Management XXXIII:

Materials Research Society Symposium Proceedings: Volume 1193

Editors: Boris E. Burakov and Albert S. Aloy

Frontmatter

[More information](#)

A Quantitative Risk Assessment Perspective on the Source Term for the Proposed Nuclear Waste Repository at Yucca Mountain	185
William M. Murphy, B. John Garrick, and Bruce E. Kirstein	
Influences of Subsurface Geological Structure Neighboring Geological Repository on Earthquake Motion of the Site.....	193
Taishi Ouchi, Hiroyuki Tsuchi, Tetsuya Ota, Koji Hane, and Toru Sasaki	
Estimation of Seismic Observation Records in the Vicinity of Large Earthquakes and Its Impact on Geological Disposal Program.....	201
Hiroyuki Tsuchi, Taishi Ouchi, Yoshikazu Ichikawa, Kazuo Okutsu, and Toru Sasaki	
 GLASS WASTE FORMS	
Liquidus Temperature and Crystallization Behavior of US Waste Glasses Investigated at KRI	211
Albert S. Aloy, Alexander V. Trofimenko, Valery Z. Belov, James C. Marra, Kevin M. Fox, David Peeler, John D. Vienna, and Dong-Sang Kim	
Measurement of HLW Glass Dissolution/Alteration Kinetics by Using Micro-Reactor Flow-Through Test Method.....	219
Y. Inagaki, S. Mitsui, H. Makigaki, K. Idemitsu, T. Arima, T. Banba, and K. Noshita	
Vitrification of High-Level Waste at the Savannah River Site	229
Kevin M. Fox and David K. Peeler	
Use of Archaeological Glass to Predict the Long-Term Behavior of HLW.....	239
S. Gin, A. Verney-Carron, and G. Libourel	
French Industrial Vitrification Plant: 30 Years Old and Still Innovating	249
E. Chauvin, C. Ladirat, and R. Do Quang	

Cambridge University Press

978-1-107-40814-2 - Scientific Basis for Nuclear Waste Management XXXIII:

Materials Research Society Symposium Proceedings: Volume 1193

Editors: Boris E. Burakov and Albert S. Aloy

Frontmatter

[More information](#)

XAFS of Pu and Hf L_{III} Edge in Lanthanide-Borosilicate Glass.....	259
A.A. Shiryaev, Ya.V. Zubabichus, S.V. Stefanovsky, A.G. Ptashkin, and J.C. Marra	
Composition Changes and Future Challenges for the Sellafield Waste Vitrification Plant.....	267
A. Riley, S. Walker, and Nick R. Gribble	
On Radiation-Induced Fluidization (Quasi-Melting) of Silicate Glasses.....	275
Michael Ojovan and Gunter Mobus	
The Impact of Increased Waste Loading on Vitrified HLW Quality and Durability.....	283
Nick R. Gribble, Rick Short, Edward Turner, and Andrew D. Riley	
Initial Investigation Into the Vitrification of High Molybdenum Solids in Borosilicate Glass	291
Barbara F. Dunnett, Nick R. Gribble, Andrew D. Riley, and Carl J. Steele	
Corrosion Behavior of Simulated LLW Glass in Deionized Water	299
Toshikatsu Maeda, Tetsuji Yamaguchi, Katsutoshi Hotta, Tsuyoshi Mizuno, and Tsunetaka Banba	
Measurement of Initial Dissolution Rate of P0798 Simulated HLW Glass by Using Micro-Reactor Flow-Through Test Method.....	307
H. Makigaki, Y. Inagaki, K. Idemitsu, T. Arima, S. Mitsui, T. Banba, and K. Noshita	
Electrochemical Description of Redox Equilibria in Nuclear Glass	315
O. Pinet and S. Mure	
Microwave Vitrification of Model Heavy Metals Carriers From Wastewaters Treatment.....	323
Milot Kovacova, Michal Lovas, Stefan Jakabsky, Maximina Romero, and Jesus Ma. Rincon	

Cambridge University Press

978-1-107-40814-2 - Scientific Basis for Nuclear Waste Management XXXIII:

Materials Research Society Symposium Proceedings: Volume 1193

Editors: Boris E. Burakov and Albert S. Aloy

Frontmatter

[More information](#)**Iron Aluminium Silico-Phosphate Glasses Including U₃O₈.....329**

Carlos J.R. Gonzalez Oliver, Diego O. Russo,
 Francisco C. Lovey, Maximina Romero, and
 Jesus Ma. Rincon

**Phase Formation in the Vitrification of Savannah River
Site SB4 HLW Sludge Surrogate Using Frit and Glass
Forming Chemicals.....337**

O.I. Stefanovsky, S.V. Stefanovsky, A.A. Akatov,
 and J.C. Marra

LOW LEVEL WASTES**Cementitious Wasteforms for Immobilization of
Low-Activity Radioactive Wastes.....349**

Dawn Wellman, Chase Bovaird, Kent Parker,
 Elsa Cordova, Aaron Davis, Shas Mattigod,
 Laura Powers, and Marcus Wood

MODELING**Modeling of Radioactive Graphite Oxidation in
Molten Salts: Computer Experiment.....359**

Nikolai M. Barbin, Dmitri I. Terentiev,
 Sergei G. Alekseyev, Marat A. Tuktarov,
 and A.A. Romenkov

**Understanding Radionuclide Migration From the
D1225 Shaft, Dounreay, Caithness, UK.....367**

David Savage, Claire Watson, James Wilson,
 Alex Bond, Warren Jones, Richard Metcalfe,
 Tony Milodowski, Colin Munro, James Penfold,
 and Sarah Watson

**Development of Scenario Analysis and Database for
Quantitative Analysis of Microbial Effects on the Repository
Performance375**

Hideki Yoshikawa, Manabu Inagaki, and Iku Miyasaka

**Quantifying Conservatism of Performance Assessment
Calculations by Sorption Model Reduction: Case Study
on Near Field Cs Migration in Callovo-Oxfordian Clay381**

Eef Weetjens, Evelien Martens, and Diederik Jacques

Cambridge University Press

978-1-107-40814-2 - Scientific Basis for Nuclear Waste Management XXXIII:

Materials Research Society Symposium Proceedings: Volume 1193

Editors: Boris E. Burakov and Albert S. Aloy

Frontmatter

[More information](#)

Overview of Design of Modular Vaults for the Storage of Low Level Nuclear Waste in the UK.....	389
Eugene M. Gallagher and Neil Shaw	
Impact of Silicon Migration through Buffer Material on the Lifetime of Vitrified Waste	397
Seiichiro Mitsui, Hitoshi Makino, Manabu Inagaki, and Takanori Ebina	
Mathematical Modeling of Transport Phenomena in Concrete Porous Media	405
Ilija B. Plecas and Slavko D. Dimovic	
 <i>RADIONUCLIDE SOLUBILITY, SPECIATION, SORPTION AND MIGRATION</i>	
Modeling Diffusion and Reaction of Cementitious Water in Bentonite.....	413
Claire Watson, Koji Hane, David Savage, Steven Benbow, Jaime Cuevas, Raul Fernandez, Simon Norris, and Marcus Amme	
Consistency of the Strontium Transport Parameters in Boom Clay Obtained From Different Types of Migration Experiments	421
Marc Aertsens, Norbert Maes, and Marc Van Gompel	
Interaction of Hydrogen Peroxide with Carbon Steel and Magnetite.....	429
Javier Gimenez, Ignasi Casas, Rosa Sureda, and Joan de Pablo	
The Influence of Groundwater on the Stability of Silica Colloids	437
Pirkko Holtta, Mari Lahtinen, Martti Hakanen, Jukka Lehto, and Piia Juhola	
Mineralogical Changes of Cement and Bentonite Accompanied with Their Interactions.....	445
Seiichi Hoshino, Tetsuji Yamaguchi, Toshikatsu Maeda, Masayuki Mukai, Tadao Tanaka, and Shinichi Nakayama	

Cambridge University Press

978-1-107-40814-2 - Scientific Basis for Nuclear Waste Management XXXIII:

Materials Research Society Symposium Proceedings: Volume 1193

Editors: Boris E. Burakov and Albert S. Aloy

Frontmatter

[More information](#)

Migration Behavior of Potassium and Rubidium in Compacted Bentonite Under Reducing Condition with Iron Corrosion Product.....	453
Kazuya Idemitsu, Hirotomo Ikeuchi, Daisuke Akiyama, Yaohiro Inagaki, and Tatsumi Arima	
The Diffusion of Tritiated Water, Chloride and Uranium Through Granite	461
Lalli Jokelainen, Jussi Ikonen, David Read, Karl-Heinz Hellmuth, and Marja Siitari-Kauppi	
Effect of Magnetism on Precipitation of Cu in bcc Fe: Ab-Initio Based Modeling	469
O.I. Gorbatov, A.V. Ruban, P.A. Korzhavyi, and Yu.N. Gornostyrev	
Surface Complexation Modeling of Am(III) Sorbed on γ-Alumina	477
Sumit Kumar, B.S. Tomar, S.V. Godbole, and V.K. Manchanda	
Dynamic Light Scattering Study of Intrinsic Colloids of Tetravalent Actinides	483
Sumit Kumar, B.S. Tomar, and V.K. Manchanda	
Effect of Calcium Silicate Hydrate Precipitates at Cementitious and Bentonite Material Interface on Long-Term Engineered Barrier System Performance in TRU Waste Disposal Facilities	489
Susumu Kurosawa, Hiroyuki Sakamoto, Kiyofumi Nitta, Chiya Numako, Kazuko Haga, Masahito Shibata, Tsutomu Sato, Toshiyuki Nakazawa, and Hitoshi Owada	
Effect of Ionic Strength on the Transport Parameters of Tritiated Water, Iodide and $H^{14}CO_3^-$ in Boom Clay	497
Marc Aertsens, Pierre De Canniere, Hugo Moors, and Marc Van Gompel	
Leaching of Bituminized Waste Products (BWP) by Pure Water: The Contribution of NMR Techniques for the Investigation of the Porous Layer	505
S. Le Feunteun, O. Diat, A. Guillermo, A. Ledieu, and A. Poulesquen	

Cambridge University Press

978-1-107-40814-2 - Scientific Basis for Nuclear Waste Management XXXIII:

Materials Research Society Symposium Proceedings: Volume 1193

Editors: Boris E. Burakov and Albert S. Aloy

Frontmatter

[More information](#)

Study of the Processes Related to the Water Uptake of Eurobitum Bituminized Radioactive Waste: Effect of Salt Concentration.....	513
An Mariën, Steven Smets, and Elie Valcke	
The Effect of Cold Work on the Creep Properties of Copper	521
Asa Martinsson and Henrik C.M. Andersson-Ostling	
Quantification of Exchangeable Cations in Interlayer of Tsukinuno Sodium-Montmorillonite	529
Haruo Sato	
Colloid and Radionuclide Transport in Granite Under Low Water Flow Rates Expected in a Geological Repository.....	537
Nairoby Albarran, Tiziana Missana, Ursula Alonso, Miguel Garcia-Gutierrez, Manuel Mingarro, and Trinidad Lopez-Torrubia	
Diffusion of Cesium and Iodine in Compacted Sodium Montmorillonite Under Different Saline Conditions	545
Yukio Tachi, Kenji Yotsuji, Yoshimi Seida, and Mikazu Yui	
Pressure Evolution of a Bituminized Washing Water Concentrate During Leaching	553
Alexander H. Waellisch	
Characterization of Granite Fractures From the In Situ FEBEX Experiment (Grimsel, Switzerland): Possible Effects on Bentonite Colloid and Radionuclide Transport.....	561
Ursula Alonso, Tiziana Missana, Miguel Garcia-Gutierrez, Alessandro Patelli, Nairoby Albarran, Trinidad Lopez-Torrubia, Daniele Ceccato, and Valentino Rigato	
Anionic and Cationic Effects on the Crevice Corrosion Susceptibility of Alloy 22	569
Ricardo M. Carranza and Raul B. Rebak	
Competitive Sorption of Metal Ions From Aqueous Solution Onto Sand.....	577
Sonia Morandi, Francesca Giacobbo, Mario Mariani, and Mirko Da Ros	

Cambridge University Press

978-1-107-40814-2 - Scientific Basis for Nuclear Waste Management XXXIII:

Materials Research Society Symposium Proceedings: Volume 1193

Editors: Boris E. Burakov and Albert S. Aloy

Frontmatter

[More information](#)

***HIGH LEVEL WASTES
AND SPENT FUEL***

Basic Research Needs on Physical Chemistry of Radionuclides in the Nuclear Fuel Cycle	587
T. Advocat, C. Ferry, F. Goutelard, C. Lamouroux, J.F. Wagner, S. Vautrin-Ul, and A. Chaussey	
Corrosion Behavior of High Burnup Spent Fuel in Highly Alkaline Solutions.....	597
A. Loida, R. Gens, V. Metz, K. Lemmens, C. Cachoir, T. Mennecart, and B. Kienzler	
Overview of the French Research on the Evolution of Spent Fuel Rod After Discharge From the Reactor.....	605
C. Ferry, C. Cappelaere, C. Jegou, J.P. Piron, M. Firon, and A. Ambard	
Effect of HBS Structure in Fast Release Fraction of 48 GWd/tU PWR Fuel.....	613
J. de Pablo, D. Serrano-Purroy, E. Gonzalez-Robles, F. Clarens, A. Martinez-Esparza, D.H. Wegen, I. Casas, B. Christiansen, J.-P. Glatz, and J. Gimenez	
The Role of Uranium Peroxide Studtite on the Retention of Cs, Sr and Se(VI).....	621
Javier Gimenez, Rosa Sureda, Joan de Pablo, Ignasi Casas, Xavier Martinez-Llado, Miquel Rovira, and Aurora Martinez-Esparza	
Rim Instant Release Radionuclide Inventory From French High Burnup Spent UOX Fuel	627
D. Roudil, C. Jegou, V. Broudic, and M. Tribet	
The Italian Regulatory System in the Radioactive Waste Management	635
Carmine Zicari and Mario Mariani	

TRANSNATIONAL PROGRAMS

The United States Department of Energy's Environmental Management Program	645
Kurt D. Gerdes and Steven L. Ross	

Cambridge University Press

978-1-107-40814-2 - Scientific Basis for Nuclear Waste Management XXXIII:

Materials Research Society Symposium Proceedings: Volume 1193

Editors: Boris E. Burakov and Albert S. Aloy

Frontmatter

[More information](#)

Extending the SFR Repository in Order to Handle Decommissioning Waste From the Swedish NPPs	655
Fredrik Vahlund and Anna Gordon	
The Behaviors of Cementitious Materials in Long Term Storage and Disposal: An Overview of Results of the IAEA Coordinated Research Project.....	663
Zoran Drace and Michael I. Ojovan	
Supporting Development of Practical Designs for a Japanese HLW Repository	673
Hitoshi Makino, Hiroyuki Umeki, Yasuhiro Ochi, Kazumasa Hioki, Hiroo Okubo, Masaaki Matsumoto, Osamu Sato, Sumio Masuda, and Ian G. McKinley	
Application of Formal Knowledge Engineering Approaches to Develop a Design Catalog for a Japanese HLW Repository.....	681
Masaaki Matsumoto, Osamu Sato, Hiroo Okubo, Hitoshi Makino, Yasuhiro Ochi, Kazumasa Hioki, Hiroyuki Umeki, Sumio Masuda, and Ian G. McKinley	
Author Index	689
Subject Index.....	693

Cambridge University Press

978-1-107-40814-2 - Scientific Basis for Nuclear Waste Management XXXIII:

Materials Research Society Symposium Proceedings: Volume 1193

Editors: Boris E. Burakov and Albert S. Aloy

Frontmatter

[More information](#)

Cambridge University Press

978-1-107-40814-2 - Scientific Basis for Nuclear Waste Management XXXIII:

Materials Research Society Symposium Proceedings: Volume 1193

Editors: Boris E. Burakov and Albert S. Aloy

Frontmatter

[More information](#)

PREFACE

The 33rd symposium on the "Scientific Basis for Nuclear Waste Management" was held May 24–29, 2009, in St. Petersburg, Russia. The symposium attracted 140 abstracts (including 41 oral and 84 poster presentations) from authors representing 24 countries, with 84 papers published in this volume. The symposium covered the usual range of topics, from studies of spent fuel, glass and ceramic waste forms, to radionuclide behavior studies. A new topic for this symposium was the session on advanced materials.

The success of the symposium and publication of this proceedings volume reflects the efforts of many people. We wish especially to thank Dr. Maria Zamoryanskaya from Ioffe Physical-Technical Institute and her young team of Ph.D. students and researchers (members of the Local Organizing Committee) listed below for their help with organizing and running the symposium, and for making sure that the manuscripts were reviewed in a timely manner. Without their help, this proceedings volume would not have been completed.

Ms. Yana Domracheva
Ms. Ekaterina Kolesnikova
Mr. Alexander Trofimov
Mr. Denis Shustov
Mr. Alexey Shakhmin

Also, we would like to express our acknowledgement to Mrs. Tatyana Mikhaylova from the company "Business Visit" who was responsible for the financial management of the symposium and all activities related to getting Russian visas and hotel reservations.

Scientific contribution by the following session chairs was quite fruitful to the success of the symposium:

Sergey Krivovichev
Thorsten Geisler
Ingo Blechschmidt
Andrew Martin
Tsunetaka Bamba
Mikhail Ojovan
Guoping Zhu

Financial assistance for the symposium was provided by Russian State Corporation "ROSATOM," V.G. Khlopin Radium Institute (KRI), Ioffe Physical-Technical Institute (IPTI) and RITVERC Isotope Company. We would like to personally thank Dr. Igor Maslennikov, KRI Director General and Dr. Valeriy Romanovskiy, KRI Deputy Director and Honorary Chairman of this symposium, for their support and contributions.

Boris E. Burakov
Albert S. Aloy

July 2009

Cambridge University Press

978-1-107-40814-2 - Scientific Basis for Nuclear Waste Management XXXIII:

Materials Research Society Symposium Proceedings: Volume 1193

Editors: Boris E. Burakov and Albert S. Aloy

Frontmatter

[More information](#)

MATERIALS RESEARCH SOCIETY SYMPOSIUM PROCEEDINGS

- Volume 1153 — Amorphous and Polycrystalline Thin-Film Silicon Science and Technology — 2009,
A. Flewitt, Q. Wang, J. Hou, S. Uchikoga, A. Nathan, 2009, ISBN 978-1-60511-126-1
- Volume 1154 — Concepts in Molecular and Organic Electronics, N. Koch, E. Zojer, S.-W. Hla, X. Zhu, 2009, ISBN 978-1-60511-127-8
- Volume 1155 — CMOS Gate-Stack Scaling — Materials, Interfaces and Reliability Implications, J. Butterbaugh, A. Demkov, R. Harris, W. Rachmady, B. Taylor, 2009, ISBN 978-1-60511-128-5
- Volume 1156 — Materials, Processes and Reliability for Advanced Interconnects for Micro- and Nanoelectronics — 2009, M. Gall, A. Grill, F. Iacopi, J. Koike, T. Usui, 2009, ISBN 978-1-60511-129-2
- Volume 1157 — Science and Technology of Chemical Mechanical Planarization (CMP), A. Kumar, C.F. Higgs III, C.S. Korach, S. Balakumar, 2009, ISBN 978-1-60511-130-8
- Volume 1158E — Packaging, Chip-Package Interactions and Solder Materials Challenges, P.A. Kohl, P.S. Ho, P. Thompson, R. Aschenbrenner, 2009, ISBN 978-1-60511-131-5
- Volume 1159E — High-Throughput Synthesis and Measurement Methods for Rapid Optimization and Discovery of Advanced Materials, M.L. Green, I. Takeuchi, T. Chiang, J. Paul, 2009, ISBN 978-1-60511-132-2
- Volume 1160 — Materials and Physics for Nonvolatile Memories, Y. Fujisaki, R. Waser, T. Li, C. Bonafos, 2009, ISBN 978-1-60511-133-9
- Volume 1161E — Engineered Multiferroics — Magnetoelectric Interactions, Sensors and Devices, G. Srinivasan, M.I. Bichurin, S. Priya, N.X. Sun, 2009, ISBN 978-1-60511-134-6
- Volume 1162E — High-Temperature Photonic Structures, V. Shklover, S.-Y. Lin, R. Biswas, E. Johnson, 2009, ISBN 978-1-60511-135-3
- Volume 1163E — Materials Research for Terahertz Technology Development, C.E. Stutz, D. Ritchie, P. Schunemann, J. Deibel, 2009, ISBN 978-1-60511-136-0
- Volume 1164 — Nuclear Radiation Detection Materials — 2009, D.L. Perry, A. Burger, L. Franks, K. Yasuda, M. Fiederle, 2009, ISBN 978-1-60511-137-7
- Volume 1165 — Thin-Film Compound Semiconductor Photovoltaics — 2009, A. Yamada, C. Heske, M. Contreras, M. Iglesias, S.J.C. Irvine, 2009, ISBN 978-1-60511-138-4
- Volume 1166 — Materials and Devices for Thermal-to-Electric Energy Conversion, J. Yang, G.S. Nolas, K. Koumoto, Y. Grin, 2009, ISBN 978-1-60511-139-1
- Volume 1167 — Compound Semiconductors for Energy Applications and Environmental Sustainability, F. Shahedipour-Sandvik, E.F. Schubert, L.D. Bell, V. Tilak, A.W. Bett, 2009, ISBN 978-1-60511-140-7
- Volume 1168E — Three-Dimensional Architectures for Energy Generation and Storage, B. Dunn, G. Li, J.W. Long, E. Yablonovitch, 2009, ISBN 978-1-60511-141-4
- Volume 1169E — Materials Science of Water Purification, Y. Cohen, 2009, ISBN 978-1-60511-142-1
- Volume 1170E — Materials for Renewable Energy at the Society and Technology Nexus, R.T. Collins, 2009, ISBN 978-1-60511-143-8
- Volume 1171E — Materials in Photocatalysis and Photoelectrochemistry for Environmental Applications and H₂ Generation, A. Braun, P.A. Alivisatos, E. Figgemeier, J.A. Turner, J. Ye, E.A. Chandler, 2009, ISBN 978-1-60511-144-5
- Volume 1172E — Nanoscale Heat Transport — From Fundamentals to Devices, R. Venkatasubramanian, 2009, ISBN 978-1-60511-145-2
- Volume 1173E — Electofluidic Materials and Applications — Micro/Biofluidics, Electowetting and Electrospinning, A. Steckl, Y. Nemirovsky, A. Singh, W.-C. Tian, 2009, ISBN 978-1-60511-146-9
- Volume 1174 — Functional Metal-Oxide Nanostructures, J. Wu, W. Han, A. Janotti, H.-C. Kim, 2009, ISBN 978-1-60511-147-6

Cambridge University Press

978-1-107-40814-2 - Scientific Basis for Nuclear Waste Management XXXIII:

Materials Research Society Symposium Proceedings: Volume 1193

Editors: Boris E. Burakov and Albert S. Aloy

Frontmatter

[More information](#)

MATERIALS RESEARCH SOCIETY SYMPOSIUM PROCEEDINGS

- Volume 1175E — Novel Functional Properties at Oxide-Oxide Interfaces, G. Rijnders, R. Pentcheva, J. Chakhalian, I. Bozovic, 2009, ISBN 978-1-60511-148-3
- Volume 1176E — Nanocrystalline Materials as Precursors for Complex Multifunctional Structures through Chemical Transformations and Self Assembly, Y. Yin, Y. Sun, D. Talapin, H. Yang, 2009, ISBN 978-1-60511-149-0
- Volume 1177E — Computational Nanoscience — How to Exploit Synergy between Predictive Simulations and Experiment, G. Galli, D. Johnson, M. Hybertsen, S. Shankar, 2009, ISBN 978-1-60511-150-6
- Volume 1178E — Semiconductor Nanowires — Growth, Size-Dependent Properties and Applications, A. Javey, 2009, ISBN 978-1-60511-151-3
- Volume 1179E — Material Systems and Processes for Three-Dimensional Micro- and Nanoscale Fabrication and Lithography, S.M. Kuebler, V.T. Milam, 2009, ISBN 978-1-60511-152-0
- Volume 1180E — Nanoscale Functionalization and New Discoveries in Modern Superconductivity, R. Feenstra, D.C. Larbalestier, B. Maiorov, M. Putti, Y.-Y. Xie, 2009, ISBN 978-1-60511-153-7
- Volume 1181 — Ion Beams and Nano-Engineering, D. Ila, P.K. Chu, N. Kishimoto, J.K.N. Lindner, J. Baglin, 2009, ISBN 978-1-60511-154-4
- Volume 1182 — Materials for Nanophotonics — Plasmonics, Metamaterials and Light Localization, M. Brongersma, L. Dal Negro, J.M. Fukumoto, L. Novotny, 2009, ISBN 978-1-60511-155-1
- Volume 1183 — Novel Materials and Devices for Spintronics, O.G. Heinonen, S. Sanvito, V.A. Dediu, N. Rizzo, 2009, ISBN 978-1-60511-156-8
- Volume 1184 — Electron Crystallography for Materials Research and Quantitative Characterization of Nanostructured Materials, P. Moeck, S. Hovmöller, S. Nicolopoulos, S. Rouvimov, V. Petkov, M. Gateski, P. Fraundorf, 2009, ISBN 978-1-60511-157-5
- Volume 1185 — Probing Mechanics at Nanoscale Dimensions, N. Tamura, A. Minor, C. Murray, L. Friedman, 2009, ISBN 978-1-60511-158-2
- Volume 1186E — Nanoscale Electromechanics and Piezoresponse Force Microscopy of Inorganic, Macromolecular and Biological Systems, S.V. Kalinin, A.N. Morozovska, N. Valanoor, W. Brownell, 2009, ISBN 978-1-60511-159-9
- Volume 1187 — Structure-Property Relationships in Biomineralized and Biomimetic Composites, D. Kisailus, L. Estroff, W. Landis, P. Zavattieri, H.S. Gupta, 2009, ISBN 978-1-60511-160-5
- Volume 1188 — Architected Multifunctional Materials, Y. Brechet, J.D. Embury, P.R. Onck, 2009, ISBN 978-1-60511-161-2
- Volume 1189E — Synthesis of Bioinspired Hierarchical Soft and Hybrid Materials, S. Yang, F. Meldrum, N. Kotov, C. Li, 2009, ISBN 978-1-60511-162-9
- Volume 1190 — Active Polymers, K. Gall, T. Ikeda, P. Shastri, A. Lendlein, 2009, ISBN 978-1-60511-163-6
- Volume 1191 — Materials and Strategies for Lab-on-a-Chip — Biological Analysis, Cell-Material Interfaces and Fluidic Assembly of Nanostructures, S. Murthy, H. Zeringue, S. Khan, V. Ugaz, 2009, ISBN 978-1-60511-164-3
- Volume 1192E — Materials and Devices for Flexible and Stretchable Electronics, S. Bauer, S.P. Lacour, T. Li, T. Someya, 2009, ISBN 978-1-60511-165-0
- Volume 1193 — Scientific Basis for Nuclear Waste Management XXXIII, B.E. Burakov, A.S. Aloy, 2009, ISBN 978-1-60511-166-7

Prior Materials Research Society Symposium Proceedings available by contacting Materials Research Society