

Joint ICTP-IAEA International School on Nuclear Waste Actinide Immobilization



10 - 14 September 2018
Trieste, Italy

Local Organizer:

Antonello Scardicchio
(ICTP - Trieste, Italy)

Further information:

[http://indico.ictp.it/event/6333/
smr3237@ictp.it](http://indico.ictp.it/event/6333/smr3237@ictp.it)

Nuclear waste management is a core issue for sustainable development and long-term viability of nuclear energy as energy supply. The main goal of this school is the dissemination of knowledge on optimal methods of synthesis and study of crystalline and glass-crystalline wasteforms for the immobilization of actinides and other long-lived dangerous radionuclides. It aims on transferring experience of ceramic and glass-composite materials fabrication from leading experts to specialists interested in reliable immobilization of toxic nuclides.

Directors:

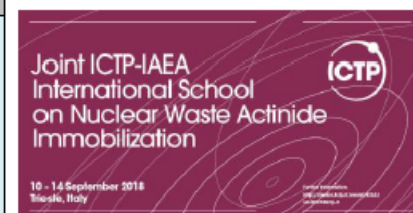
Michael I. Ojovan
(IAEA-Vienna, Austria)
Boris E. Burakov
(Radium Institute, S. Petersburg, Russian Federation)

Organising Committee:

Bill Lee, Imperial College London, UK
Florence Bart, CEA, France
Boris Burakov, Khlopin Radium Institute, Russia
Michael Ojovan, IAEA, Vienna

Joint ICTP-IAEA International School on Nuclear Waste Actinide Immobilization". 10-14.09.2018. Provisional Agenda

| Time | Monday: OPENING. INTRODUCTION TO CERAMIC AND GLASS PROCESSING, AND ACTINIDE IMMOBILIZATION | Tuesday: RADIATION DAMAGE EFFECTS IN ACTINIDE-DOPED MATERIALS AND GLASSES | Wednesday: ACTINIDE BEHAVIOUR DURING SEVERE NUCLEAR ACCIDENT, AND DURING NUCLEAR TESTS | Thursday: ADVANCED MATERIALS BASED ON DURABLE ACTINIDE HOST-PHASES – NEW TYPES OF Pu FUELS AND TARGETS FOR ACTINIDE TRANSMUTATION | Friday: MODELLING OF ACTINIDE MIGRATION IN GEOLOGICAL – INTERACTION OF ACTINIDE WASTES AND GEOLOGICAL ENVIRONMENT |
|---------------|--|--|---|---|---|
| 09.00 - 09.45 | Introduction. <i>Organising committee:</i> M. Ojovan, B. Burakov, A. Scardicchio. WE Lee, F. Bart | Invited Lecture: Radiation damage in crystalline wasteforms Maik Lang | Invited Lecture: Actinide Behaviour during severe nuclear accident - Chernobyl Boris Burakov | Invited Lecture: Development of nuclear electric batteries based on durable actinide-doped crystals Maria Zamoryanskaya | Invited Lecture: Modelling of actinide migration in geological environment Laurent De Windt |
| 09.45- 10.30 | Invited lecture: Actinides Science Ross Springell | Invited lecture: Radiation damages in vitreous wasteforms Christophe Jegou | Invited lecture: Fission Product Behaviour under Light Water Reactor Sever Accident in the Light of Fukushima Dai-ichi NPS Masahiko Osaka | Invited Lecture: New types of Pu fuel and targets for actinide transmutation Philippe Martin | Invited Lecture: Actinide transfer in-situ of geological formations: mineral-chemical and isotope-geochemical aspects Vladislav A. Petrov |
| | Break | Break | Break | Break | Break |
| 10.45 - 11.30 | Invited Lecture: How to synthesize a good ceramic? – William (Bill) E Lee | Leach Behaviour of actinide-doped ceramics and glasses Bella Zubekhina | Invited Lecture: Actinide Behaviour during severe nuclear accident – TMI Andriy Sizov | Invited Lecture: Pu-loaded glasses and crystals: evolution due to self-irradiation Andrey Shiryayev | Invited Lecture: Migration of radionuclides: actual issues Lara Duro |
| 11.30 - 12.00 | Invited lecture: How to synthesize a good glass? – Florence Bart | Open Discussion: Leach Behaviour of actinide-doped ceramics and glasses: approaches and methods to work with radioactive materials B. Burakov | Invited Lecture: Isotopic composition of plutonium in the Arctic Seas and identification of the sources of contamination Andrey Stepanov | Invited Lecture: Accident tolerant fuels Simon Middleburgh | Closure Session / Feedback |
| 12.00 - 12.30 | Open Discussion I: How to immobilize actinides? B. Burakov, WE Lee, M Ojovan | | | | |
| | Lunch | Lunch | Lunch | Lunch | |
| 13.30- 14.15 | Open Discussion II: How to immobilize actinides? B. Burakov, WE Lee, M Ojovan | Invited Lecture: Leach behaviour of Spent Fuel, Actinides-doped materials Christophe Jegou | Invited Lecture: Raman characterization of corium Sandrine Miro | Current Scenario of nuclear waste management programs in India. Saurabh Kr. Sharma. Micro-structural analysis & radiation stability studies in undoped and cerium doped zirconolite. Kaur Rajveer. Structural response of zirconolite-type compositions on swift heavy ion irradiation. Gupta Merry (INDIA). | |
| 14.15- 15.00 | Invited lecture: Fundamentals of radiation damage M. Rushton | Invited lecture: Leach behaviour of Corium Daniel Serrano-Purroy | Understanding the Effectiveness of Plutonium Surrogates for Waste and Stockpile Immobilisation. Lewis Blackburn (UK). The role of nuclear material characterisation laboratory in the radioactive waste research. Fabio Girardi (ITALY). | | |
| | Break | Break | Break | Break | |
| 15.15- 15.35 | Self-glowing crystals with Pu238 – Iulia Ipatova | Invited lecture: Corrosion Behaviour of Glass John Vienna | The effect of composition on chemical properties of borosilicate glasses containing potassium oxide. Zohreh Hamnabard | High Level radioactive waste treatment in India. Asha (INDIA). Nuclear Waste: Thorium fuel Vs. Uranium fuel. Elsalamouny Noura (EGYPT) | |
| 15.35- 16.00 | Self-glowing ceramics with Pu238 – Oxana Bogdanova | | | | |
| 16.00 - 17.00 | Introducing of each participant by him(her)-self | The CERUS project in the Argentina's back-end strategy for the research reactor spent fuel. Ariel Chaves. Immobilization of simulated nuclear wastes in yttrium aluminosilicate glass. Diana Lago. (ARGENTINA). Natural analogues of actinide ceramic waste forms. Quixiang Cao (CHINA) | Vitrification in Iran Amir Charkhi (IRAN). | | |
| 18.00 | Social event | | | | |



<http://indico.ictp.it/event/8333/>



The Abdus Salam
**International Centre
for Theoretical Physics**
www.ictp.it



Joint ICTP/IAEA Workshop on Radioactive waste management – solutions for countries without nuclear power programme

2 – 6 November 2015

(Miramare - Trieste, Italy)

The Workshop on radioactive waste management – solutions for countries without nuclear power programme is jointly organized by The Abdus Salam International Centre for Theoretical Physics (ICTP) and the International Atomic Energy Agency (IAEA).

Purpose

The Workshop aims to advise countries having small amount of waste from different research, medical, and industrial sources (institutional waste) which physico-chemical characteristics of radioactive waste should be considered and how to interpret them to effectively create

Organizers

Michael Ojovan
(IAEA, Vienna)

Peter Ormai
(IAEA, Vienna)

Local organizer

Claudio Tuniz
(ICTP, Trieste)



Joint ICTP/IAEA Workshop on radiation effects in nuclear waste forms and their consequences for storage and disposal

12 - 16 September 2016

Miramare, Trieste, Italy

The Workshop on radiation effects in nuclear waste forms and their consequences for storage and disposal is jointly organized by The Abdus Salam International Centre for Theoretical Physics (ICTP) and the International Atomic Energy Agency (IAEA).

PURPOSE

The Workshop aims to gain awareness on the most recent findings of research into radiation effects in nuclear waste forms and their role for waste storage and disposal. It aims to contribute to the transfer of specific knowledge to Member States towards their capacity building efforts and competence in nuclear waste immobilization and disposal.

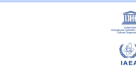
FOCUS

The Workshop will focus mainly on experts on radiation effects in materials to explore the potential of both experimental and theoretical/computational approaches aiming to understand the consequences of irradiation of materials under extreme conditions, particularly focusing on long-term irradiation conditions envisaged for nuclear waste forms containing long lived fission products and actinides.

TOPICS

The main topics of the Workshop are:

- Fusion and fusion power generation: challenges in the use of materials;
- Role of irradiation at different stages of material use in the nuclear industry;
- Nuclear waste forms: envisaged irradiation storage and disposal conditions;
- Behaviour of materials containing actinides and long lived radionuclides;
- Experimental techniques to investigate and simulate radiation effects;
- Theoretical/computational methods to investigate and simulate radiation effects.



Co-Sponsors
International Atomic Energy Agency
(IAEA)
Vienna, Austria



Directors

Michael I. OJOVAN
(IAEA, Austria)
Neil C. HYATT
(University of Sheffield, UK)


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 International Centre
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**Joint ICTP/IAEA Workshop on
 Radioactive waste management –
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 nuclear power programme**

2 – 6 November 2016
 (Miramare – Trieste, Italy)

The Workshop on radioactive waste management – solutions for countries without nuclear power programme is jointly organized by The Abdus Salam International Centre for Theoretical Physics (ICTP) and the International Atomic Energy Agency (IAEA).


Purpose
 The Workshop aims to address countries having great amount of waste from different research, medical, and industrial sources (radioactive waste) whose physicochemical characteristics of radioactive waste should be considered and how to regulate them to effectively consider opportunities for safe collection, processing, storage and disposal of the radioactive waste, ensuring transparency from waste and spent fuel from research reactors, ICTP and IAEA.

Facilitator
 This workshop will have leading on waste management professionals, both operators and regulators, from countries without nuclear power programme to share experiences of the technical, legal and physical and chemical waste characteristics, measures for regulation or appropriate national legislation for safe and efficient management of radioactive waste.

Organizers
 Michael Ojovan
 (IAEA, Vienna)
 Fabio Ortolano
 (IAEA, Vienna)
 Local organizer
 Claudio Tassi
 (ICTP, Trieste)


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 for Theoretical Physics**
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Joint ICTP/IAEA Workshop on radiation effects in nuclear waste forms and their consequences for storage and disposal


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Joint ICTP-IAEA Workshop on Radiation Effects in Nuclear Waste Forms
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Joint ICTP/IAEA Workshop on Fundamentals of Vitrification and Vitreous Materials for Nuclear Waste Immobilization



IAEA



The Abdus Salam
International Centre
for Theoretical Physics



Further information:

Activity URL: <http://indico.ictp.it/event/8002/>

E-mail: smr3159@ictp.it



Joint ICTP-IAEA Workshop on Fundamentals of Vitrification
and Vitreous Materials for Nuclear Waste Immobilization

6 - 10 November 2017

Miramare, Trieste - Italy

Directors:

M.L. CJOVAN, IAEA, Vienna

R.J. HAND, University of Sheffield, UK

Joint ICTP-IAEA
International School
on Nuclear Waste Actinide
Immobilization



10 - 14 September 2018
Trieste, Italy

Activity URL: <http://indico.ictp.it/event/8032/>
E-mail: smr3159@ictp.it

Joint ICTP/IAEA Workshop
on Fundamentals of
Vitrification and Vitreous
Materials for Nuclear
Waste Immobilization

6 - 10 November 2017
Trieste, Italy



The Workshop is devoted to advances in understanding fundamentals of vitrification and utilization of vitreous materials in nuclear applications focusing on topics related to immobilization of nuclear wastes.

Directors:
W. CURRAN, IAEA, Vienna
R. FORTI, ICTP, Trieste



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10 - 14 September 2018
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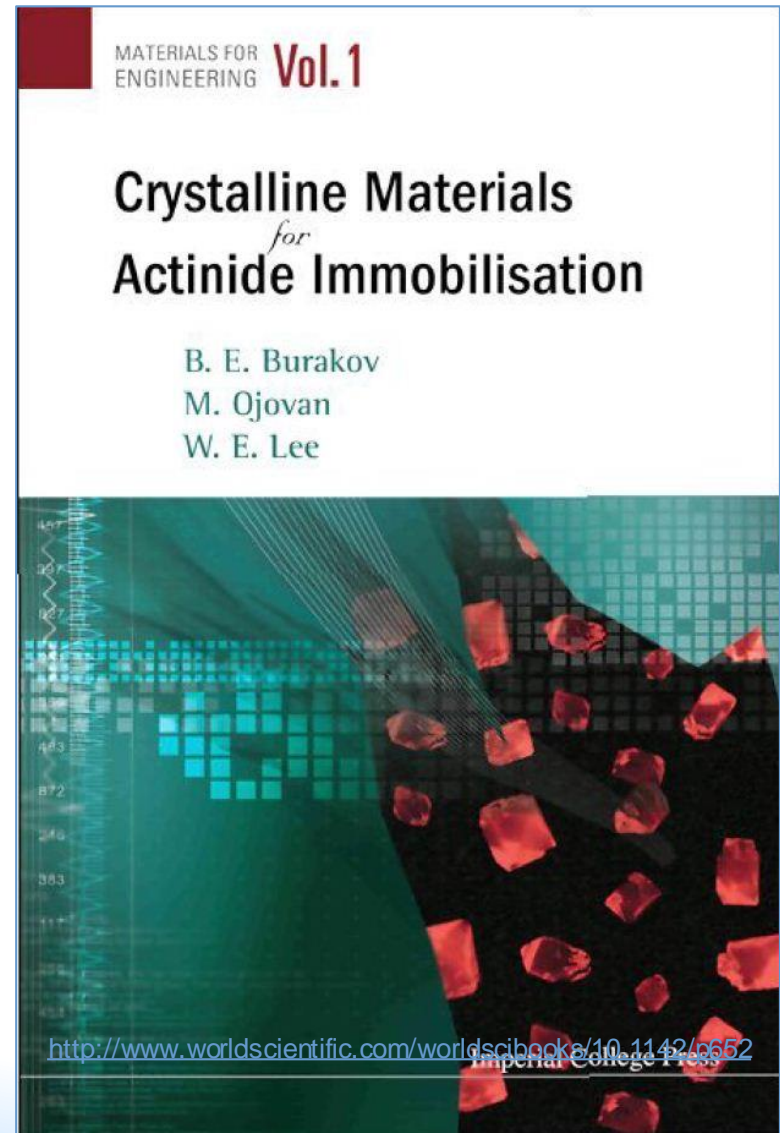
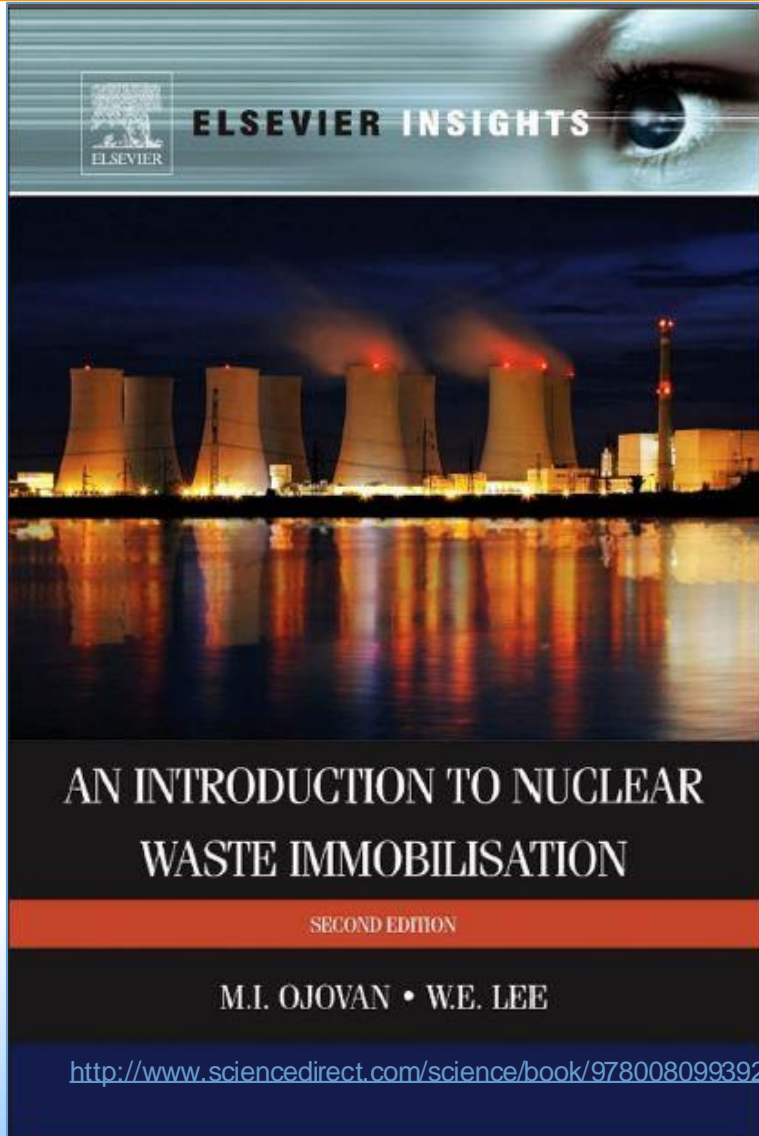


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M.I. Ojovan, W.E. Lee. *An Introduction to Nuclear Waste Immobilisation*, Second Edition, Elsevier, Amsterdam, 362 p. (2014).

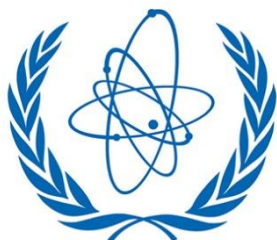
B.E. Burakov, M.I Ojovan, W.E. Lee. *Crystalline Materials for Actinide Immobilisation*, Imperial College Press, London, 198 p. (2010).



IAEA Supported Tools

IAEA Support: E-learning for stakeholders and newcomers to the field

[Link](#)



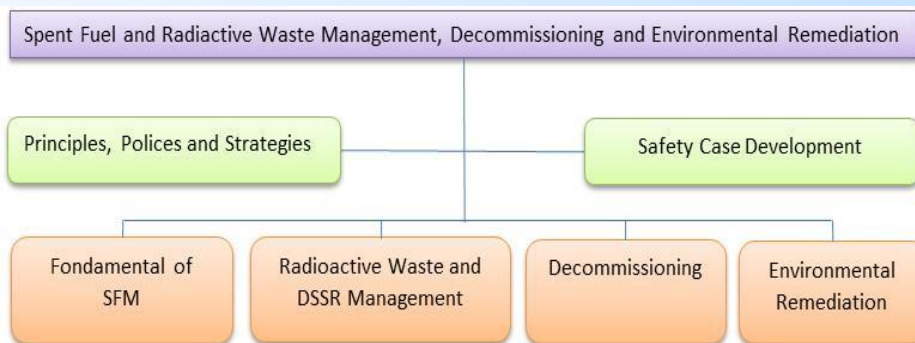
IAEA

International Atomic Energy Agency

Atoms for Peace and Development

IAEA Support: Networks Web Based Tools to support information sharing

[Link II](#)



Networks

URF Geological Disposal Underground Research Facilities for Geological Disposal
[Learn More / Join URF](#)

IDN International Decommissioning Network Decommissioning of Nuclear Facilities
[Learn More / Join IDN](#)

MSN Management System Network of Excellence Management System Network
[Learn More / Join MSN](#)

ENV Network on Environmental Management and Remediation ENVIRONET - Environmental Remediation and NORM Management Network
[Learn More / Join ENVIRONET](#)

NNE Networking Nuclear Education Community of Practice

DISP International Low Level Waste Disposal Network Near Surface Disposal of Low Level Radioactive Waste
[Learn More / Join DISPONET](#)

CGULS Coordination Group for Uranium Legacy Sites Coordination Group for Uranium Legacy Sites
[Learn More / Join CGULS](#)

LAB International Network of Laboratories for Nuclear Waste Characterization LABONET - International Network of Laboratories for Nuclear Waste Characterization
[Learn More / Join LABONET](#)

bDN beta-Delayed Neutron Emission beta-Delayed Neutron Emission
[Learn More / Join bDN](#)

RSLS Regulatory Supervision of Legacy sites International Working Forum

SFM Spent Fuel Management International Network on Spent Fuel Management
[Learn More / Join SFM](#)

ICT I&C Technologies Instrumentation and Control Technologies Network
[Learn More / Join ICT](#)

NKM Nuclear Knowledge Management Network Nuclear Knowledge Management Network
[Learn More / Join NKM](#)

IPN International Predisposal Network forum for the sharing of practical experience

and international developments on radioactive waste management activities before disposal.

IAEA Networks - CONNECT Link



beta-Delayed Neutron Emission



International Decommissioning Network



Networking Nuclear Education - NNE



Nuclear Energy Capacity Building Hub



International Predisposal Network



Working Forum on Regulatory Supervision of Legacy Sites - RSLs - Coming soon!



Coordination Group for Uranium Legacy Sites



International Network of Laboratories for Nuclear Waste Characterization - LABONET



International Network on Spent Fuel Management



International Low Level Waste Disposal Network - DISPONET



Management System Network of Excellence



Underground Research Facilities for Geological Disposal Network



Network on Environmental Management and Remediation - ENVIRONET



Nuclear Knowledge Management Network

60th IAEA General Conference

26 - 30 September 2016, Vienna International Centre, Vienna

Welcome to the IAEA International Predisposal Network - IPN

Prior to disposal, the radioactive waste usually goes through a number of steps such as pre-treatment, treatment, conditioning, storage and transport with characterization utilised within the entire cycle of radioactive waste. Predisposal management encompasses all of these steps that collectively cover the activities from waste generation up to final disposal.

The International Predisposal Network (IPN) is a forum for the sharing of practical experience and international developments on radioactive waste management activities before disposal.

The IPN is being established to increase efficiency in sharing international experience in the application of proven, quality assured practices for the predisposal management of radioactive waste including used nuclear fuel declared as waste.

The IAEA intends to support Member States either currently engaged in or seeking to develop predisposal technologies through their inclusion in the IPN to cooperate and coordinate relevant actions, training and technical advances. IPN members will include organisations and communities with current and future interest in radioactive waste management with focus on predisposal management. These include operators and regulatory bodies, as well as supporting organisations and scientific institutions and organizations that are involved with education and training.

For further information or questions please contact: IPN.Contact-Point@iaea.org

Featured Publications

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Partnering Organizations



Current Highlights

- The 43rd MRS Symposium on Scientific Basis for Nuclear Waste Management organized in cooperation with the International Atomic Energy Agency will be held at IAEA, Vienna on 21 – 24 October 2019.
- New CRP "Long-lived Alpha Bearing Waste Management - Characterization, Processing and Storage" to start in 2018.

Events

- Regional Workshop RER9143 on the "Processing of legacy radioactive waste (International Predisposal Network - IPN)"

60th IAEA General Conference

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Welcome to the IAEA International Predisposal Network - IPN

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The IPN aims to increase efficiency in sharing international experience in the application of proven, quality assured practices for the management of radioactive waste including used nuclear fuel declared as waste.

The IPN provides a platform for States, either currently engaged in or seeking to develop predisposal technologies through their inclusion in the network and coordinate relevant actions, training and technical advances. IPN members include organisations and companies with a future interest in radioactive waste management with focus on predisposal management. These include operators, regulators, as well as supporting organisations and scientific institutions and organizations that are involved with education and training.

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IAEA, Vienna, 21 – 24 October 2019.
Symposium organizer: Michael Ojovan



Scientific Basis
for Nuclear Waste
Management

MRS2017 - Scientific Basis for Nuclear Waste Management Symposium 2017
Sydney, Australia 29 October - 3 November 2017



Thank you!