



OECD Nuclear Energy Agency
International Workshop on



Structural Materials for Innovative Nuclear Systems

Hosted by

Idaho National Laboratory, Idaho Falls, USA
7-10 October 2013

Programme



Monday, 7 October

9.00 Registration

Opening session

9.30-9.45 Welcome address from INL

Todd Allen

9.45-10.00 Welcome address from NEA

*Stéphanie Cornet
(on behalf of Thierry Dujardin)*

Session I

Chair: James Marrow

10.00-10.30 **Invited talk**
Industrial perspectives on material choices for advanced
nuclear systems

Martine Blat-Yrieix (EDF R&D,
France)

10.30-11.00 Coffee break

11.00-11.30 **Invited talk**
Use of user facilities for the R&D of innovative materials

Todd Allen (USA, INL)

Overview on Programs

11.30-11.55	The new EC FP7 MatISSE project: Materials Innovations for a Safe and Sustainable nuclear in Europe	Céline Cabet (CEA, France)
11.55-12.25	IAEA Coordinated Research Projects (CRP) supporting development of structural materials for innovative nuclear systems	Victor Inozemtsev (IAEA)

12.30-14.00: **Lunch**

Session II: Metal Alloys

Chairs: David Gandy and Victor Inozemtsev

14.00-14.30 Invited Talk

	Code qualification and material data needs for licensing	Davide Bernardi (ENEA, Italy)
14.30-14.55	Generation IV and Transmutation Materials (GETMAT) Project: First assessment of results	Concetta Fazio (KIT, Germany)
14.55-15.20	Materials for innovative Lead Alloy cooled Nuclear Systems-overview	Georg Müller (KIT, Germany)
15.20-15.45	Development of coatings for liquid Pb corrosion protection in next Generation IV future reactors	Alessandro Gessi (ENEA, Italy)

15.45-16.15 **Coffee break**

16.15-16.40	Overview of 9Cr steels properties for structural application in Sodium Fast Reactors	Céline Cabet (CEA, France)
16.40-17.05	Stress Corrosion Cracking and Oxidation of Austenitic Stainless steel 316 in Supercritical Water Reactor	Alberto S Aez (CIEMAT, Spain)

17.05-17.35 **Discussion**

19.00 (TBC) **Conference Dinner**

Tuesday, 8 October 2013

8.30-15.00 **Registration**

Session III: Metal Alloys

Chairs: Concetta Fazio & Richard Wright

9.00-09.25	Nickel based alloys compatibility with fuel salts for molten salt reactor with thorium and uranium support	Olga Feynberg/Victor Ignatiev (Russian Federation)
9.25-9.50	Mechanical Properties of Ni-based superalloys in high temperature steam environments	Changheui Jang (KAIST, Rep. Korea)
9.50-10.15	Novel Experiments to Characterize Creep-Fatigue Degradation in VHTR Alloys	Richard Wright (INL, USA)

10.15-10.45 **Coffee break**

10.45-11.10	Fatigue and Creep Crack Propagation behaviour of Alloy 617 in the Annealed and Aged Conditions	Julian Benz (INL, USA)
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11.10-11.35	Evaluation of In-Situ Tritium Transport Parameters for Type 316 Stainless Steel during Irradiation	Walter LUSCHER (PNNL, USA)
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11.35-12.00	Discussion	
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12.00-14:00	Lunch	
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Session IV: Novel Pathways

Chairs: Céline Cabet & Ji-Yeon Park

14.00-14.25	Powder Metallurgy and Hot Isostatic Processing for Research for Structural and Pressure Retaining Applications within the Electric Power Industry	David Gandy (EPRI, USA)
14.25-14.50	Processing of a novel nanostructured ferritic steel via spark plasma sintering and investigation of its mechanical and microstructural characteristics	Indrajit CHARIT (Uni. of Idaho, USA)
14.50-15.15	Development of swelling-resistant ODS and ferritic-martensitic alloys based on insights obtained using self-ion irradiation at a very high dpa rate	Frank Garner (DSL Extreme, USA)

15.15-15.30	Discussion	
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15.30-16.00	Coffee Break	
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Session 1 : Poster session on Metal Alloys & Novel Pathways

Chair: Todd Allen & Lorenzo Malerba

16.00-17.30	Presentations on posters (3 mins each)	
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17.30-19.00	Poster Session	
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Wednesday, 9 October

Session V: Ceramics and Ceramic Composites

Chairs: Georg Müller + Hirotatsu Kishimoto

9.00-9.25	Extra-Safe LWR Core with SiC/SiC Fuel Cladding by NITE Method	Akira Kohyama (Muroran Institute of Technology, Japan)
9.25-9.50	Fabrication and Properties of SiC Ceramics for the Application of advanced nuclear system	Ji-Yeon Park (KAERI, Rep. Korea)
9.50-10.15	Inhibition of Oxidation in Nuclear Graphite	Philip Winston (INL, USA)

10.15-10.45	Coffee break	
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10.45-11.10	Effect of Neutron Irradiation on Select Mn+1AXn Phases	Darryl Tallman (SRNL, USA)
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11.10-11.35	Helium Irradiated Ti ₃ AlC ₂	Maulik PATEL (UTK, USA)
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11.35-12:00	Potentiometric Oxygen Sensor Based on Gadolinia Doped Ceria (GDC) for the Use in SFR Application	SangHun SHIN (Korea)
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12.00-12.30	Discussion	
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12.30-14.00 **Lunch**

Session VI: Fundamentals & Ions vs. Neutrons

Chair: Frank Garner & Alessandro Gessi

14.00-14.25	An EXAFS Study of Radiation Damage in ZrC and ZrN	Jeff Terry (IIT, USA)
14.25-14.50	Overview of On-Going Studies on the Fast-Reactor Cladding Material AIM1	Arnaud Courcelle (CEA, France)
14.50-15.20	Invited talk Perspectives on modelling materials far from equilibrium	Pascal Bellon (UIUC, USA)
15.20-15.35	Discussion on session	

15.35-16.00 **Coffee break**

16.00-16.25	Nanostructure evolution under irradiation and correlation with mechanical property changes in neutron irradiated Fe-Cr alloys	Lorenzo Malerba (SCK-CEN, Belgium)
16.25-16.50	Ab initio based kinetic Monte-Carlo simulations of phase transformations in FeCrAl	Pär Olsson (KHT, Sweden)

16.50-17.00 **Discussion**

Session 2: Posters on Fundamentals & Ceramics

Chairs: Grace Burke & Karl Nilsson

17.00-18.30 **Presentations on posters (3 mins each)**

18.30-20.00 **Poster Session**

Thursday, 10 October

Session VII: Discussion on Ion vs. Neutron Irradiation

Chair: Stuart Maloy

9.00-9.20	Neutron vs ion irradiation: differences and similarities in the nanostructural evolution of Fe-Cr alloys irradiated at 300°C	Lorenzo Malerba (SCK-CEN, Belgium)
9.20-9.40	Ion Beams as a Quantitative Surrogate for Neutrons: is there a path forward?	Michael Fluss (LLNL, USA)
9.40-10.00	Is the "temperature shift" model valid for correlation of neutron and charged particle irradiations?	Frank Garner (DSL Extreme, USA)
10.00-11.00	Discussion	
11.00-11.45	Meeting Summary from the session chairs	
11.45-12.30	Open discussion Closing speech (10 mins)	James Marrow

12.30-14.00 **Lunch** (*provided for people on the tour*)

14.00-17.00 **Technical tour – INL facilities**