

*OECD Nuclear Energy Agency*

*International Workshop on*

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**Structural Materials for
Innovative Nuclear Systems**

*Hosted by*

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

Programme

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| **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)*  |
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| ***Session I******Chair: James Marrow*** |
| 10.00-10.30 | ***Invited talk*** Industrial perspectives on material choices for advanced nuclear systems  | Martine Blat (EDF R&D)  |
| 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 (INL, USA) |
|  | ***Overview on Programs*** |
| 11.30-11.5511.55-12.25 | The new EC FP7 MatISSE project: Materials Innovations for a Safe and Sustainable nuclear in EuropeIAEA Coordinated Research Projects (CRP) supporting development of structural materials for innovative nuclear systems | Céline Cabet (CEA, France)Victor Inozemtsev (IAEA) |
| 12.30-14.00:  | **Lunch** |
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| *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 | The Influence of Neutron Irradiation on the Mechanical Properties of Structural Materials in LBE Environment | Erich STERGAR (SCK-CEN, Belgium) |
| 16.40-17.05 | Overview of 9Cr steels properties for structural application in Sodium Fast Reactors | Céline Cabet (CEA, France) |
| 17.05-17.30 | Stress Corrosion Cracking and Oxidation of Austenitic Stainless steel 316 in Supercritical Water Reactor | Alberto S Aez (CIEMAT, Spain)  |
| 17.30-18.00 | **Discussion**  |
| 19.00 (TBC) | **Conference Dinner** |
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| **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 Feinberg/Victor Ignatiev ( Russia Federation) |
| 9.25-9.50 | Mechanical Properties of Ni-based superalloys in high temperature steam environments | Changheui Jang (KAIST, Rep. of 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) |
| 11.10-11.35 | Evaluation of In-Situ Tritium Transport Parameters for Type 316 Stainless Steel during Irradiation | Walter LUSCHER (PNNL, USA) |
| ~~11.35-12.00~~ | ~~Microstructure Reconstruction for Phase Field Modeling of Irradiated Cladding~~ | ~~Bradley FROMM (INL, USA)~~ |
| 12.00-12.30 | **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. 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**  |
| 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)** |
| 17.30-19.00 | **Poster Session ( + drinks)** |
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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 LWR Fuel Cladding | Ji-Yeon Park (KAERI, Rep. of Korea) |
| 9.50-10.15 | Inhibition of Oxidation in Nuclear Graphite | Philip Winston (INL, USA) |
| 10.15-10.45 | **Coffee break** |
| 10.45-11.10 | Effect of Neutron Irradiation on Select Mn+1AXn Phases | Darryl Tallman (SRNL, USA) |
| 11.10-11.35 | Helium Irradiated Ti3AlC2 | Maulik PATEL (UTK, USA) |
| 11.35-12:00 | Potentiometric Oxygen Sensor Based on Gadolinia Doped Ceria (GDC) and Yttria Stabilized Zirconia (YSZ) for the Use in SFR Application | SangHun SHIN (Korea) |
| 12.00-12.30 | **Discussion**  |
| 12.30-14.00 | **Lunch** |
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| ***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 ( + drinks)** |
| ***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 discussionClosing speech (10 mins) | James Marrow (Uni. Oxford, UK)  |
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| 12.30-14.00 | Lunch (*provided for people on the tour*) |
| 14.00-17.00 | **Technical tour – INL facilities** |