



11th INTERNATIONAL SYMPOSIUM ON HIGH-TEMPERATURE CORROSION AND PROTECTION OF MATERIALS

Helios Hotel - Les EMBIEZ (Var) France – June 9-14, 2024

PROGRAM

SUNDAY JUNE 9

14h-19h 30 Welcome of Participants (HTCPM Front desk @ Helios hotel) – Rooms available from 5:00 PM

19h30

WELCOME PARTY

20h30

Symposium Opening and Opening Addresses

Jérôme Favergeon and Bruce Pint

OPENING CONFERENCE

Chairmen: Bruce Pint / Jérôme Favergeon

21h00

Invited plenary lecture: The role of carbon in oxidation of refractory metal carbides – ID 286
*Stephens, Connor; Richwine, Michael; Uy, Alexandra; Recupero, Christopher; [Opila, Elizabeth](#)**
**University of Virginia, USA*

MONDAY JUNE 10

Before
lunch

Posters from sessions A+B+C to be put in place – Pagnol room

SESSION A - FUNDAMENTALS

Chairmen: John H Perepezko and Aurélie Van de Put

8h30

PLENARY lecture: Breakaway Oxidation of Ferritic Stainless Steels in Low pO₂ Humid Gases: The Role of Cr-Depletion and alpha-to-gamma Transformation – ID 223
[Chyrkin, Anton](#); Froitzheim, Jan; Zurek, Joanna; Naumenko, Dmitry*
**Chalmers University of Technology, Sweden*

9h10

Keynote lecture: A TEM Study of the Early-stage Oxidation of Cr-containing Fe-, Ni-, Co- based and Complex Concentrated Alloys – ID 266
[Wonneberger, Robert](#); Apell, Jonathan; Seyring, Martin; Wisniewski, Wolfgang; Stöcker, Hartmut; Undisz, Andreas*
**Chemnitz University of Technology, Germany*

- Keynote lecture: Impact of high temperature pre- and post-combustion hydrogen environments on oxidation and mechanical behavior of Fe- and Ni-based alloys – ID 245**
9h40 [Romedenne, Marie](#)*; Poplawsky, Jonathan; Su, Yi-Feng; Willoughby, Adam; Johnston, Brandon; Haynes, James Allen; Pint, Bruce A.; Pillai, Rishi
 *Oak Ridge National Laboratory, USA
- 10h10** **COFFEE BREAK**
- Chairmen: *Christine Geers and Henri Buscail*
- PLENARY lecture: Detrimental Effect of Ti on High Temperature Oxidation Behavior of Al₂O₃-forming Austenitic Fe-based Alloys – ID 220**
10h30 Tatsushima, Ryo; [Hayashi, Shigenari](#)*; Yoneda, Suzue
 *Hokkaido University, Japan
- Keynote lecture: How can the change of reaction gases explain the influence of tungsten on nitrogen uptake in titanium-based alloys? – ID 130**
11h10 [Gautier, Kevin](#)*; Monceau, Daniel; Epifano, Enrica; Connétable, Damien; Gheno, Thomas
 *Université de Toulouse, France
- Keynote lecture: Oxidation of Plutonium Alloys Stabilized in delta phase – ID 119**
11h40 [Ravat, Brice](#)*
 *CEA Valduc, France
- 12h10** **LUNCH**
- After lunch** **POSTER PRESENTATION FOR SESSIONS A, B and C – Pagnol room**
- 16h30** **COFFEE BREAK**

SESSION B – MOLTEN SALT AND DEPOSIT INDUCED CORROSION

- Chairmen: *Jan-Erik Svensson and Jean-Michel Brossard*
- PLENARY lecture: Corrosion of commercial alloys in ternary carbonate melt at 700 and 750 °C - role of LiFeO₂ formation – ID 287**
17h00 [Spiegel, Michael](#)*; Schraven, Patrik
 *Salzgitter Mannesmann Forschung GmbH, Germany
- Keynote lecture: Can Crucible Tests Advance Molten Salt Corrosion Research? – ID 218**
17h40 [Grégoire, Benjamin](#)*; Pedraza, Fernando
 *La Rochelle Université, France
- Keynote lecture: Corrosion of a Nickel-Based Alumina Forming Alloy In Molten NaCl-MgCl₂ at 600°C for the Development of a Molten Salt Nuclear Reactor – ID 191**
18h10 Pellicot, Louis; [Martinelli, Laure](#)*; Gruet, Nathalie; Serp, Jerome; Malacarne, Romain; Bosonnet, Sophie
 *CEA, Université Paris-Saclay, France
- Keynote lecture: Effect of Ash/Sulphate Ratio on Corrosion of Ni-based Alloys in a Simulated Combustion Environment – ID 107**
18h40 Xi, Xuteng; [Zhang, Jianqiang](#)*; Young, David
 *The University of New South Wales, Australia
- 19h30** **DINNER**
- 21h00 – 22h30** **POSTER PRESENTATION FOR SESSIONS A, B and C – Pagnol room**

TUESDAY JUNE 11

Before lunch Posters from sessions D+E+F (part I) to be put in place – Pagnol room

SESSION C – MODELING, PREDICTION, SIMULATION

Chairmen: Mitsutoshi Ueda and Loïc Favergeon

8h30 **PLENARY lecture: Modeling the Role of the Grain Structure in the Oxidation of Polycrystals – ID 110**

[Gheno, Thomas](#)*

* ONERA, Université Paris Saclay, France

9h10 **Keynote lecture: Implications of Internal Oxidation in Materials Processing – Mechanisms and Modeling Concepts – ID 205**

Seregin, Aleksej; Chakraborty, Anindita; Babaei, Nima; Gramlich, Alexander; Jahns, Katrin; Undisz, Andreas; [Krupp, Ulrich](#)*

* RWTH Aachen University, Germany

9h40 **Keynote lecture: Rate Limiting Step of the Corrosion Process of M5Framatome alloy in simulated PWR conditions - Electric field effect on migration of hydrogen and oxygen species through oxide layer – ID 278**

[Tupin, Marc](#)*; Queyhat, Benoit; Martin, Frantz; Jublot, Michael; Bataillon, Christian

* CEA, Université Paris Saclay, France

10h10 **COFFEE BREAK**

10h30 **Keynote lecture: Durability Of a Chromia-forming Ni-Based Alloy in Water Vapor-Rich Gas at High Temperature with Modelling of the Test Bench Atmosphere – ID 190**

[Duthoit, Guillaume](#)*; Vande Put, Aurélie; Caussat, Brigitte; Vergnes, Hugues; Monceau, Daniel

* Université de Toulouse, France

11h00 **Keynote lecture: A Model For Data-Driven Discovery Of Alloys Resistant To Molten Salt Corrosion – ID 153**

[Herschberg, Rafael](#)*; Martinelli, Laure; Balbaud-Célérier, Fanny; Tancret, Franck

* Nantes Université, France

11h30 **Keynote lecture: Strategies to design and fabricate structural materials for molten halide salts fueled technologies – ID 268**

[Pillai, Rishi](#)*; Sulejmanovic, Dino; Su, Yi-Feng; Raiman, Stephen; Pint, Bruce .A.

* Oak Ridge National Laboratory, USA

12h00 **LUNCH**

After lunch **POSTER PRESENTATION FOR SESSIONS D, E and F (part I) – Pagnol room**

16h15 **COFFEE BREAK**

SESSION D – OXIDATION IN COMPLEX ATMOSPHERE

Chairmen: Lars-Gunnar Johansson and Fabien Rouillard

16h45 **PLENARY lecture: Effects of H₂ on Cr₂O₃ Scale Microstructures Grown in Water Vapour – ID 123**

Nguyen, Thuan Dinh; Zhang, Jianqiang; [Young, David John](#)*

* University of New South Wales, Australia

17h25 **Keynote lecture: Evaluation of Environmental Resistance in an Ammonia Atmosphere by Using a Proton Conductor – ID 109**

[Fukamoto, Michihisa](#)*; Takahashi, Hiroki; Martinelli, Laure; Bosonnet, Sophie; Desgranges, Clara

* Akita University, Japan

- 17h55 **Keynote lecture: Metal dusting on Ni-Cu alloys: Dependence of High-temperature Attack on Alloying with Iron and Manganese – ID 207**
[Ulrich, Anke Silvia](#)*; Kasatikov, Sergey; König, Till; Fantin, Andrea; Galetz, Mathias Christian
 * University of Bayreuth, Germany
- 18h25 **Keynote lecture: Effect of Ni-base alloy chemistry on the growth rate and adherence of oxide scales formed at high temperatures in a CO₂ environment – ID 255**
[Naumenko, Dmitry](#)*; Kuo, Yen-Ling; Povstugar, Ivan; Wessel, Egbert; Vayyala, Ashok; Lebendig, Florian
 * Forschungszentrum Jülich GmbH, Germany
- 18h55 **Keynote lecture: Oxide scale failure mechanism under varying metal dusting conditions – ID 263**
 Schlereth, Clara; Weiser, Martin; White, Emma Marie Hamilton; Felfer, Peter; [Galetz, Mathias Christian](#)*
 * DECHEMA-Forschungsinstitut, Germany
- 19h45 **DINNER**
- 21h15 – 22h45 **POSTER PRESENTATION FOR SESSIONS D, E and F (part I) – Pagnol room**

WEDNESDAY JUNE 12

Before lunch **Posters from sessions F (part II)+G+H+I to be put in place – Pagnol room**

SESSION E – MECHANICAL ASPECTS OF HIGH TEMPERATURE CORROSION

Chairmen: *Mary Taylor and Muriel Braccini*

- 8h30 **PLENARY lecture: Impact of oxygen on the creep properties of refractory alloys at 1300°C – ID 265**
[Dryepondt, Sebastien](#)*; Ridley, Mackenzie; Bell, Sam; Pint, Bruce
 * Oak Ridge National Laboratory, USA
- 9h10 **Keynote lecture: Effect of Dissolved Oxygen and Mechanical Loading on the Surface and Intergranular Oxidation of a 316L Stainless Steel in Simulated Primary Water of Nuclear Reactors – ID 219**
[Duhamel, Cécilie](#); De Paula, Thalita; Maisonneuve, Marc; Guerre, Catherine; De Curières, Ian; Crépin, Jérôme
 * Mines Paris PSL University, France
- 9h40 **Keynote lecture: Oxygen Insertion in Titanium due to High Temperature Oxidation Makes it Brittle, Stiffer & Stronger: a Microtensile and High Speed Nanoindentation Study at the Sub-Grain Level – ID 244**
[Texier, Damien](#)*; Sirvin, Quentin; Dziri, Ayyoub; Proudhon, Henry; Yastrebov, Vladislav; Forest, Samuel; Richeton, Thiebaud; Legros, Marc
 * IMT Mines Albi, France
- 10h10 **COFFEE BREAK**
- 10h30 **Keynote lecture: Low Cycle Fatigue/Corrosion interactions at 950 °C of AM1 single crystal Nickel-based superalloy – ID 124**
[Martin, Angéline](#)*; Drouelle, Elodie; Cormier, Jonathan; Pedraza, Fernando
 * Safran Aircraft Engines – Université de Poitiers – La Rochelle Université, France
- 11h00 **Keynote lecture: Characterisation of Environmentally Assisted Cracking Observed in a Single Crystal Nickel-Based Superalloy – ID 271**
 Dawson, Karl; Duarte-Martinez, Fabian; Gray, Simon; Nicholls, John; Gibson, Grant; Leggett, Jonathan; [Tatlock, Gordon](#)*
 * University of Liverpool, United Kingdom

11h30 **Keynote lecture: Experimental and phase field analysis for diffusion/mechanical coupling applied to γ - γ' superalloys – ID 208**
[Maurel, Vincent](#)*; *Jbara, Wajih; Ammar, Kais; Forest, Samuel*
* Mines Paris PSL University, France

12h00 **LUNCH**

After lunch **FREE AFTERNOON – SOCIAL ACTIVITIES**

SESSION F – COATINGS

Chairmen: *Francisco Javier Trujillo and Valérie Parry*

17h30 **PLENARY lecture: Unexpected Fast Growth of alpha-Al₂O₃ needles at 600° C in Chloride Containing Environments – ID 186**
[Aguero, Alina](#)*; *Audigié, Pauline; Gutiérrez, Marcos; Rodríguez, Sergio; Ssentenza, Vincent; Jonsson, Torbjörn; Johansson, Lars-Gunnar*
* Instituto Nacional de Técnica Aeroespacial INTA, Spain

18h10 **Keynote lecture: Improved Oxidation Resistance And Cr Retention Of coated AISI441 For SOC Application – ID 183**
[Couturier, Karine](#)*; *Giacometti, Nathalie; Hanoux, Pierre; David, Thomas; Dejob, Théo; Bestatutte, Jolan; Rouillard, Fabien*
* CEA Grenoble, France

18h55 **Keynote lecture: Synthesis of nickel coatings against high temperature degradation of steel SOEC interconnects – ID 146**
[Boccaccini, Louis](#)*; *Rouillard, Fabien; Pedraza, Fernando*
* Université Paris-Saclay, CEA - La Rochelle Université, France

20h00 **BANQUET**

THURSDAY JUNE 13

SESSION G – CERAMICS AND NOVEL MATERIALS

Chairmen: *Mark Weaver and Francis Rebillat*

9h00 **PLENARY lecture: Understanding and Stability of Mixed Oxide-Sulfate Deposits and Implications for Hot Corrosion of Advanced Alloys and Coatings – ID 194**
*Chikhalikar, Atharva; [Poerschke, David](#)**
* University of Minnesota, USA

9h40 **Keynote lecture: Durability of E/TBCs: a physicochemical approach of the corrosion of ceramics by CMAS type molten silicates – ID 125**
*Bonnal, Justine; Petitjean, Carine; [Panteix, Pierre-Jean](#)**; *Bonina, David; Arnal, Simon; Vilasi, Michel*
* Université de Lorraine, France

10h10 **COFFEE BREAK**

10h30 **Keynote lecture: Corrosion of SiC-Refractories in Municipal Solid Waste Incineration Plants – ID 174**
[Menet, Claire](#)*; *Lima, Alexandre; Brossard, Jean-Michel*
* Veolia Recherche et Innovation (VERI), France

- 11h00 **Keynote lecture: Oxidation Behavior of Alumina Forming High Entropy Alloys Prepared by Selective Laser Melting – ID 282**
*Lee, Jhuo-Lun; Yeh, An-Chou; [Murakami, Hideyuki](#)**
** National Institute for Materials Science, Japan*

SESSION H – INFLUENCE OF ADDITIVE MANUFACTURING (PART I)

Chairmen: *David Shifler and Benoît Panicaud*

- 11h30 **PLENARY lecture: Influence of Alloy 625 Manufacturing Processes on Oxidation and Associated Fatigue Performance – ID 241**
[Gleeson, Brian](#)*; *DeLeon, Grace*
** University of Pittsburgh, USA*

12h00 **LUNCH**

After lunch **POSTER PRESENTATION FOR SESSIONS F (part II), G, H and I – Pagnol room**

16h20 **COFFEE BREAK**

SESSION H – INFLUENCE OF ADDITIVE MANUFACTURING (PART II)

Chairmen: *David Shifler and Benoît Panicaud*

- 16h40 **Keynote lecture: Impact of Additive Manufacturing on the High Temperature Durability of AISI 316L Austenitic Stainless Steel – ID 156**
Siri, Corentin; [Popa, Ioana](#); Vion, Alexis; Chevalier, Sébastien*
** Université de Bourgogne, France*

- 17h10 **Keynote lecture: High Temperature Corrosion of Compositionally Graded Materials Fabricated by Laser Metal Deposition – Powder – ID 173**
Curnis, Agathe; Popa, Ioana; [Prillieux, Aurélien](#); Chevalier, Sébastien*
** IRT Saint Exupéry, France*

SESSION I – ADVANCED CHARACTERIZATION TECHNIQUES (PART I)

Chairmen: *Emmanuelle Marquis and Sophie Bosonnet*

- 17h40 **PLENARY lecture: Atomic scale understanding of Cu oxidation using in situ Environmental TEM – ID 158**
[Yang, Judith C.](#)*; *Li, Meng; Curnan, Matthew T.; House, Stephen D.; Saidi, Wissam A.*
** University of Pittsburgh - Brookhaven National Lab, USA*

- 18h20 **Keynote lecture: FIB-SEM Tomography unravelling Microstructural Changes in FeCrAl(Mo) caused by Selective Element Leaching in Molten Chlorides – ID 200**
[Jahns, Katrin](#)*; *Hamdy, Esraa; Geers, Christine*
** University of Applied Sciences Osnabrück, Germany*

- 18h50 **Keynote lecture: Understanding The Phenomenon Of High Temperature Hydrogen Attack (HTHA) Responsible For Ferrite-Pearlitic Steels Damage – ID 141**
[Chevreux, Nicolas](#)*; *Flament, Camille; Gillia, Olivier; David, Thomas; Goti, Raphael; Le Nevé, Charles; Andrieu, Eric*
** Université Grenoble Alpes, CEA - LITEN, France*

19h30 **DINNER**

21h00 – **CEFRACOR medal award ceremony to Michel Vilasi – Pagnol room**

21h30 *Chair : Philippe Marcus, CEFRACOR President*

21h30 – **POSTER PRESENTATION FOR SESSIONS F (part II), G, H and I – Pagnol room**
 23h00

FRIDAY JUNE 14

SESSION I – ADVANCED CHARACTERIZATION TECHNIQUES (PART II)

Chairmen: *Jerzy Jedlinski and Virgil Optasanu*

- 8h30** **Keynote lecture: In situ Corrosion and Mass Transport Monitoring of Structural Alloys in High-Temperature Molten Chloride Salts – ID 250**
[Couet, Adrien](#); Wang, Yafei; Olson, Aeli; Falconer, Cody; Mitchell, Ivan; Zhang, Hongliang; Sridharan, Kumar; Engle, Jonathan*
** University of Wisconsin-Madison, USA*
- 9h00** **Keynote lecture: The Application of ToF-SIMS spectrometry to better understand oxidation mechanisms, with in situ measurements, isotopic tracers, combined chemical and mechanical factors – ID 275**
[Marcus, Philippe](#); Seyeux, Antoine*
** ChimieParisTech, France*
- 9h30** **Keynote lecture: Design of Oxidation Resistant Alloys using Combinatorial Approaches with Chemically Graded Materials – ID 169**
[Ghanes, Sabrina](#); Perrut, Mikael; Epifano, Enrica; Vaubois, Thomas; Cosquer, Yohan; Monceau, Daniel*
** ONERA, Université Paris-Saclay - Université de Toulouse, France*
- 10h00** **COFFEE BREAK**
- 10h30** **BEST POSTER AWARDS**
- CONCLUSIONS OF HTCPM 2024**
- 11h00** **Highlights of scientific conclusions from the conference with the analysis of the survey (Bruce PINT)**
- 12h00** **LUNCH BOX**