
WELCOME TO THE

**21ST INTERNATIONAL
CONFERENCE ON**



**Environmental Degradation of Materials
in Nuclear Power Systems – Water Reactors**

Monday
August 07

Avalon Room	A	B	C/D
Time			
8:00 AM	Plenary	-	-
10:25 AM	Morning Break		
	Advanced Reactors	Modeling	CANDU
10:45 AM	An Investigation into High Temperature Water Corrosion on Reduced Activation Ferritic Martensitic Steel Eurofer 97	IGSCC initiation and crack growth models for cold worked stainless steels	Preferential intergranular oxidation of Alloy X-750 spacers in CANDU off-chemistry environments
	David Kumar	Thierry Couvant	Adriano Eidi Yaedu
11:10 AM	Assessing Stainless Steel Compatibility in Flowing Fluoride Salts at 650°-750°C	Coupled Microstructure-Based Stress Corrosion Cracking Simulations of Type 304 Stainless Steel with Fast Fourier Transform Crystal Plasticity	Simulating High-Temperature Fretting Wear Degradation in Representative Environments
	Bruce Pint	Benjamin Anglin	Anne McLellan
11:35 AM	High Temperature Creep and Fatigue Deformation and Mechanisms of Alloy 800H Weldments Using Different Filler Materials	A multiscale implementation of stress corrosion cracking in FEM	Assessing the performance of a novel Fe based material for replacement of Co-based alloy Stellite in CANDU reactor components
	Wenjing Li	Michal Sedlak Mosesson	Hung (Harry) Ha
12:00 PM	Lunch		
1:30 PM	Best Practices for the Design and Operation of Corrosion Test Systems for Molten Salt Advanced Reactor Applications	Modelling SCC crack tip electrochemistry of austenitic stainless steel in high temperature water	HEPro Industrial Development
	Kevin J. Chan	Zhang Lefu	Jacqueline Parco
1:55 PM	Regulatory Consideration of Environmental Degradation in Licensing Light Water Small Reactor in Canada	Effect of Water Chemistry on Stress Corrosion Crack Growth Rate of Cold Worked Stainless Steel Evaluated by Crack Tip Strain Rate Model	
	Xuejun Wei	Dan Akazawa	Special Session
2:20 PM	HIGH TEMPERATURE MECHANICAL PERFORMANCE OF TYPE 316L STEELS MANUFACTURED BY POWDER METALLURGY HOT ISOSTATIC PRESSING	Urania fuel degradation to U3O8 and point defects and fission products studies.	Factors Contributing to PLLA Biomedical Device Degradation During In-Core Irradiation
	Mark Callaghan	Barbara Szpunar	Mackenzie Tigwell
2:45 PM	Te-Induced Embrittlement of Alloy 617 in Molten FLiNaK		Interim Result of a Detailed Investigation on a Cracked Pipe Weld in the Pressurizer Spray Line of a PWR in Japan
	Mohammad Umar Farooq Khan		Yasufumi Miura
3:10 PM	Afternoon Break		
		Nickel Alloy Initiation Testing	
3:30 PM	Launch of Research Program for the Study of Leaking Repository Groundwater Interactions with Cladding and Used Fuel Container Materials During Spent SMR Fuel Storage	Stress Corrosion Crack Growth Testing of Weld Root Defects: Test Techniques and Implications for Testing of Smaller Welding-Induced Defects	Microstructure evolution and degradation of mechanical properties due to short-term thermal aging of cast austenitic stainless steels
	Olga Yurivna Palazhchenko	Denise Paraventi	Changheui Jang
3:55 PM	Best Practices for Fracture Mechanics Based Testing for Environmentally Assisted Cracking in Advanced Reactor Applications	Effects of Surface Modification Techniques on PWSCC Initiation Behavior of Inconel 600	Non-Destructive Detection of Spinodal Decomposition in Cast Austenitic Stainless Steels
	Andrew Meyer Brittan	Seunghyun Kim	Aljazzy Alahmadi
4:20 PM	Helium environmental interactions with structural materials - a historical perspective	Sub-Yield Stress SCC Initiation Behavior of Alloy 182 and Alloy 600	Understanding the effect of stress on carburisation of Type 316H stainless steel in a simulated AGR gas coolant
	Andrew Wisbey	Mychailo Toloczko	James Rafferty
4:45 PM	End of Day 1	Investigation of Short Crack Nucleation in Cold Worked Alloy 690 and its Weld Metals under Constant Load in Simulate PWR Primary Water	End of Day 1
		Ziqing Zhai	
5:10 PM		End of Day 1	

Avalon Room	A	B	C/D
Time	Advanced Reactors Day 2	Nickel Alloy Initiation Day 2	Zirconium and Fuel Cladding
8:20 AM	Point defects and fission products in U3O8.	Overview of the EPRI-NRC Ni-Base Alloy Primary Water Stress Corrosion Cracking Initiation Testing Project	The Effect of Shot Peening on Corrosion and Deuterium Pickup of Zr-2.5Nb
	Jayangani Ranasinghe	Eric Focht	Heidi Nordin
8:45 AM	Materials Degradation Assessments for Advanced Reactors		Laboratory Analysis of Lower End Cap Weld
	Chris Wax	Nickel Alloy CGR Testing	Cody Dale Williams
9:10 AM	Corrosion and Cracking of Short Listed Cladding Materials for Supercritical Water-Cooled Reactors	Development of Fatigue Crack Growth Rate Equations for Ni-Base Alloys	The Influence of Strain on Corrosion Behaviour of Zirconium Alloys
	Zhang Lefu	William Blankenship	Choen May Chan
9:35 AM		Study on SCC Growth Resistance of Nickel-base Alloy Weld Materials with High Chromium Content in BWR Environments	Hydride Related Failure under Hoop Stress in Zircaloy-4 Cladding
		Takahiro Hayashi	Jerzy Antoni Szpunar
10:00 AM	Morning Break		
	New Manufacturing Methods		
10:20 AM	PWSCC Crack Growth Rate Testing of Wrought, HIP and Additively Manufactured Alloy 625 in a PWR Environment.	Impact of Hydrogen on SCC of Ni Alloys in Low Hydrogen Environments	Accelerated characterization of Zircaloy-4 and ATF cladding creep behavior in accident relevant conditions
	Jennifer Borg	Ainsley Pinkowitz	Samuel Bell
10:45 AM	Corrosion and stress corrosion cracking behavior of 316 L stainless steel produced by additive manufacturing wire processes in water environments	Stress Corrosion Cracking, Fatigue and Combined Crack Growth Rates of Alloy 600 in a PWR environment	The Effect of Microstructure on Delayed Hydride Cracking and Fatigue Endurance in Zircaloy-2
	Micaela Goland	Stuart L. Medway	Choen May Chan
11:10 AM	Scratch Beneath the Surface: Corrosion Performance of Wire-Based AM 308L Stainless Steel and the Effect of Surface Finish	Effect of PWHT on Dominating Parameters Affecting SCC Growth Rate of Ni-base Weld Metals	Irradiation and Oxygen Effects on Silicon Carbide Corrosion under Hydrothermal Conditions
	Courtney L. Clark	Katsuhiko Kumagai	Liyan Qiu
11:35 AM	Functionally Graded NiMo Overlays for Improved Corrosion Resistance in Molten Salts	The Influence of Load on Crack Length Measurements Made Using Electrical Potential Drop	First-principles study on stability of intermetallic phases in Cr-alloy coated Zr-alloy cladding of nuclear fuel
	Maria Inman	Rigel Hanbury	Ying Chen
12:00 PM	Lunch		
	Stainless Steel 1		
1:30 PM	Mechanical properties and corrosion characteristics of PM-HIP materials according to the powder manufacturing process	The Effect of Low Amplitude High Frequency Cyclic Loading on the Stress Corrosion Cracking Performance of Stainless Steel in Deaerated Water	Hydrothermal Corrosion and Steam Oxidation Behavior of FeCrAl alloys in Multiple Environments
	Gidong Kim	Dave Morton	Rajnikant V. Umretiya
1:55 PM	Fatigue performance of additively manufactured 316L stainless steel	SCC Crack Growth Rate Testing of LPBF Additive 316L SS	In Situ Strain Analysis of Cr-coated Zircaloy-4 Under Simulated LOCA Conditions
	Yiren Chen	Peter L. Andresen	Mackenzie Ridley
2:20 PM	Effect of Water Chemistry on Crack Growth Rates in Neutron Irradiated Additively Manufactured 316L and 718	Stress Corrosion Crack Initiation and Stress Relaxation of Cold Worked Piping in Hydrogenated Water	Mechanical properties of CrN coatings on Zircaloy substrates for the development of accident-tolerant fuel cladding
	Drew Coulson Johnson	Tyler Moss	Mahdi Bagheripoor
2:45 PM	SCC damage identification of 718 alloy, obtained by laser powder bed fusion (LPBF) in simulated PWR medium	Experimental investigation and modelling approach of corrosion fatigue of 304L stainless steel in simulated LWR water	Internal Pressure Fatigue Testing of Fuel Cladding
	Vanina Pelouard	Mustafa Subasic	Heidi Nordin
3:10 PM	Afternoon Break		
3:30 PM	Industrially Scalable Fabrication of Additively Manufactured Molybdenum Alloys	Atmospheric stress corrosion cracking of Austenitic Stainless Steel	Fundamental study to understand effect of FeCrAl alloy chemistries on their corrosion performance
	John Carpenter	Ryan Matthews	Bhavani Sasank Nagothi
3:55 PM	Property graded alloys with co-optimized mechanical properties and environmental resistance for high temperature applications	End of Day 2	End of Day 2
	Bruce Pint		
4:20 PM	End of Day 2		

Avalon Room	A	B	C/D
Time	Plant Chemistry	Stainless Steel 1 Day 2	Mechanistic Understanding
8:20 AM	Effect of Chloride and Sulfate Transients on Crack Growth Rates of Stainless Steels and Alloy 182 Welds	Corrosion behavior in simulated PWR primary water and microstructural changes of stainless steel welds after thermal aging and ion-irradiation	Combined effects of chloride ion and dissolved oxygen on SCC growth of low-alloy steels in high temperature water
	Peter L. Andresen	Katsuhiko Fujii	Tomohiro Takita
8:45 AM	Radiolysis modeling in PWR core. A parametric analysis based on radiation field contributors along fuel assemblies and simulation of the inhibition of water α -radiolysis via H ₂ addition	Chloride-Induced SCC of Stainless Steels with Relevance to Spent Fuel Dry Storage	Fatigue Crack Growth of Type 304/304L Stainless Steel in Pressurized Hydrogen Gas at Elevated Temperature
	Damien Kaczorowski	Mychailo Toloczko	Bryan D. Miller
9:10 AM	The Effects of Water Chemistry on Zn and Co Incorporation in the Oxide of 316 SS formed in Simulated BWR water		Effects of long-term isothermal aging on microstructural and mechanical property evolution in ferritic-martensitic steels for sodium-cooled fast reactor applications
	Dora Capone	Stainless Steel 2	Adam Koziol
9:35 AM	Investigating the effect of hydrodynamics and coolant chemistry on CRUD deposition in regions of accelerated fluid flow.	Effect of surface finish on SCC susceptibility of 316L stainless steel in high-temperature oxygenated water	Mechanistic study of internal oxidation of alloy 690 in hydrogenated steam
	Fabio Scenini	Hiroshi Abe	Ali Riahi
10:00 AM	Morning Break		
10:20 AM	A coupled analyses of water radiolysis and ECP for evaluation of the corrosive conditions in BWRs and PWRs	Stress corrosion crack growth behavior of precipitation hardening martensitic stainless steel in simulated BWR environment	TEM characterization of surface and crack oxidation of a 316L stainless steel in PWR water after hydrogenated-oxygenated cycles
	Kuniki Hata	Dan Akazawa	Cécilie Duhamel
10:45 AM	Quantification of Nickel Leaching Rates from Nickel-Bound Tungsten Carbide (WC) Rotors used in Primary Heat Transport System and Reactor Cooling System Mechanical Pump Seals	Effect of aerated transients on stress corrosion cracking of 316L SS in high temperature water	Preferential oxidation of martensite in austenitic stainless steels in high-temperature water: Implications for stress corrosion cracking
	Rosa Elia Ortega	Catherine Guerre	Kudzanai Mukahiwa
11:10 AM	Durability of Online NobleChem™ During Impurity Transients in Boiling Water Reactors	Microstructural characterization on initial stage of IGSCC and TGSCC of Type316L stainless steel in PWR primary water environment	Effect of microstructure on IGSCC susceptibility of austenitic alloys
	Michelle Mura	Shinji Fujimoto	Takaharu Maeguchi
11:35 AM		Understanding the effect of temperature on the fatigue crack growth of austenitic stainless steels in hydrogenated water	
		Fabio Scenini	
12:00 PM	Lunch and Free Afternoon		

Thursday
August 10

Avalon Room	A	B	C/D
Time	Irradiated Materials	Stainless Steel 2 Day 2	Nickel Alloy Testing
8:20 AM	A Novel Facility for Studying Corrosion via in-situ Raman Spectroscopy and Proton Irradiation: Oxidation of Proton Irradiated and Cold-Worked SS 304L in Water at 300°C	Sulfur Effects on Stress Corrosion Cracking of Stainless Steel in Deaerated Water	Effects of microstructure and environment's chemical composition on oxidation and IGSCC of alloy 600 on the secondary side of PWRs
	Vindel Simeon Ramsundar	Elaine West	Pierre MESTRE-RINN
8:45 AM	Effect of Helium Concentrations on Weldability of Irradiated Stainless Steel 304	Slow Strain Rate Testing of 304 Stainless Steel Girth-Welded Pipe in Aerated Water	The Role of Delta Phase in the Stress Corrosion Cracking (SCC) of Alloy 718 in Simulated Pressurized Water Reactor (PWR) Primary Water (PW)
	Wenjing Li	Justin Hesterberg	Mi Wang
9:10 AM	Crack Growth Rate in Irradiated Core Barrel Weld and Heat-Affected Zone in PWR Primary Water		ODSCC behavior for Alloy 690 SG tube material in caustic solutions containing complex chemical species
	Anders Jensen		Dong Jin Kim
9:35 AM	Irradiation Assisted Stress Corrosion Cracking of 304L and 347 Stainless Steel Alloys in Simulated PWR Primary Water		Surface and intergranular oxidation in simulated primary water of model Alloy 600 with aluminum and magnesium oxide inclusions.
	Abdullah S. Sinjlawi		Colette Perez
10:00 AM	Morning Break		
10:20 AM	Post Irradiation Examination of Harvested PWR Baffle Former Bolts		Testing of Lead Stress Corrosion Cracking (PbSCC) Inhibitor Candidate
	Xiang (Frank) Chen		Brent Capell
10:45 AM	Radiation Damage in a PWR Baffle-Bolt CW 316 Austenitic Stainless Steel Irradiated by Self-ions at High Doses and Temperatures: Comparison with a Fast Reactor Irradiation		High-resolution microscopy investigation of early SCC initiation of Alloy 182 in simulated PWR primary water
	Jan Michalicka		Matt Olszta
11:10 AM			
	Close		

21ST INTERNATIONAL CONFERENCE ON



Environmental Degradation
of Materials in Nuclear Power
Systems – Water Reactors

Hosted by



Sponsored by

ONTARIO **POWER**
GENERATION



Canadian Nuclear
Laboratories

Laboratoires Nucléaires
Canadiens

Dominion Engineering, Inc.

EPRI



한국원자력연구원
Korea Atomic Energy Research Institute

NAVAL NUCLEAR
LABORATORY



Studsvik