

**Program of
3rd International Conference on
Maintenance Science and Technology
for Nuclear Power Plants**



Graduate School at Shenzhen, Tsinghua University,

Shenzhen, CHINA

November 1-4, 2016

**Program of
ICMST-Shenzhen 2016**

**Graduate School at Shenzhen, Tsinghua University,
Shenzhen, CHINA
November 1-4, 2016**

**School of Materials Science and Engineering, Tsinghua University
Graduate School at Shenzhen, Tsinghua University
Shenzhen Science and Technology Association**

Preface

3rd International Conference on Maintenance Science and Technology
(ICMST-Shenzhen 2016)
Tsinghua University, Shenzhen, China
1-4 November, 2016

After the success of International Conference on Maintenance Science and Technology (ICMST) conference in Tokyo (2012) and Kobe (2014), it is my great honor to announce that the 3rd ICMST conference is coming to Shenzhen, China during Nov 1st – 4th (2016), with the joint efforts of Japan Society of Maintainology (JSM) and Tsinghua University. The newly decorated conference hall in the beautiful campus of Tsinghua Graduate School at Shenzhen is welcoming more than 200 participants from all over the world.

The Fukushima Daiichi Nuclear Plant accident alerted the importance of Maintainology in nuclear industry. Maintenance Science and Technology is an engineering discipline that provide basis for scientifically rational maintenance activities. The discipline optimizes maintenance activities from the viewpoints of safety and economics. Complicated as it is, it requires the joint efforts among industries, universities and research institutions, and also requires the cooperation of different countries. From the very beginning, the ICMST conference has been devoted to providing an international platform to continuously contribute to our current maintenance practice.

The scope of the 3rd ICMST is “Materials and Systems for Safe Nuclear Energy”. While it still concentrates on the inspection, risk assessment, maintenance, repairing, and decommissioning of nuclear power plants, it also extends to the core technical topics of radiation effects and material reliability. Furthermore, the Chinese participants from almost all corners of the Chinese nuclear industry are bringing their achievements and needs to share with us.

Finally, I would like to thank all of your great efforts and kind help on preparing and organizing the conference. And I wish you enjoy your stay in Shenzhen.

Zhengcao LI
Chairman of ICMST-Shenzhen 2016

ICMST 2016 Agenda

| | | | | | | |
|---|--|---|--|--|--|--|
| Nov 1st (Tue) | 14:00-22:00 Registration (Jin Bai He Hotel) | | | | 15:00 ISC Meeting (Rm 501) | 18:00-20:00 Reception |
| Nov 2nd (Wed) | 8:30-9:00 (1st Floor) Opening Ceremony | 9:00-10:20 (1st Floor) Plenary Session (Chair: T. TAKAGI) | 10:50-12:40 (Rm 504) Session WA-1 (M. MORI) Inspection Technology | 14:00-15:40 (Rm 504) Session WA-2 (T. UCHIMOTO) Inspection Technology - Components | 15:50-16:50 (Rm 504) Session WA-3 (M. KAMAYA) Inspection Technology – Diagnosis | 17:00-18:00 (5th Floor) Poster Session |
| | | | 10:50-12:40 (Rm 503) Session WB-1 (Yichu WU) Nuclear Materials for Next Generation Reactors | 14:00-15:30 (Rm 503) Session WB-2 (Chi ZHANG) Micro-structural Evolution of Nuclear Materials | 15:50-16:50 (Rm 503) Session WB-3 (Ben XU) Stress and Cracking | |
| | | | 10:50-12:20 (Rm 502) Session WC-1 (F. KOJIMA) Maintenance Theory and Program | 14:00-15:30 (Rm 502) Session WC-2 (H. ABE) Maintenance Technology | 15:50-16:50 (Rm 502) Session WC-3 (A. NISHIMURA) Maintenance Technology | |
| | | | 10:50-12:20 (Rm 501) Session WD-1 (S. YANAGIHARA) Advanced Nuclear Fuels | 14:00-15:30 (Rm 501) Session WD-2 (Peng DOU) Inspection Strategies | 15:50-16:50 (Rm 501) Session WD-3 (O. MIHALACHE) Inspection Strategies | |
| Nov 3rd (Thu) | 8:30-10:30 Plenary Session (1st Floor) (Chair: Yikang DOU) | | 10:30-18:00 Technical Tour | | | 18:00-20:00 Banquet |

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|-------------------------------------|---|--|--|--|---|---------------------------------------|
| Nov 4th (Fri) | 8:30-9:10 (1st Floor) Plenary Session (Chair: H. SCHUT) | 9:30-10:50 (Rm 504) Session FA-1 (Hongmei LI) Inspection Technology – X-Ray, Laser and Acoustic | 11:10-12:30 (Rm 504) Session FA-2 (Cuixiang PEI) Inspection Technology – Acoustic | 14:00-15:20 (Rm 504) Session FA-3 (K. SUZUKI) Inspection Technology – Magnetic Signals, Neutron and Component | 15:40-16:40 (Rm 504) Session FA-4 (M. SUZUKI) Micro-structural Evolution of Nuclear Materials | 17:10 Closing Ceremony |
| | | 9:30-10:50 (Rm 503) Session FB-1 (J. ETOH) RPV Steel and Characterization – TEM and Nano Indentation | 11:10-12:50 (Rm 503) Session FB-2 (K. MURAKAMI) Performance of Nuclear Materials | 14:00-15:20 (Rm 503) Session FB-3 (Qunjia PENG) Corrosion and Fatigue | 15:40-16:50 (Rm 503) Session FB-4 (Yunhan LING) Corrosion and Fatigue | |
| | | 9:30-10:50 (Rm 502) Session FC-1 (T. SAKAUE) Decommissioning Theory and Technology | 11:10-12:50 (Rm 502) Session FC-2 (K. FUKUMOTO) Decommissioning Method and Equipment | 14:00-15:00 (Rm 502) Session FC-3 (T. AOKI) Decommissioning – Waste Disposal | Open for Free Discussion | |
| | | 9:30-11:00 (Rm 501) Session FD-1 (R. VOSKO-BOYNIKOV) Micro-structure and Modelling | 11:10-13:00 (Rm 501) Session FD-2 (Yan-Bing HE) Micro-structure and Modelling | 14:00-15:20 (Rm 501) Session FD-3 (M. WAGEMAKER) Micro-structure and Modelling | 15:40-16:40 (Rm 501) Session FD-4 (Yao SHEN) Micro-structure and Modelling | |

ICMST 2016 Program

Length of speeches:

Plenary speeches: 30 min presentation + 5 min discussion

Keynote speeches: 25 min presentation + 5 min discussion

Invited speeches: 15 min presentation + 5 min discussion

Technical speeches: 15 min presentation + 5 min discussion

Venue:

Plenary Session: Major Conference Hall on 1st Floor of Energy and Environment Building

Session A: Room 504 on 5th Floor of Energy and Environment Building

Session B: Room 503 on 5th Floor of Energy and Environment Building

Session C: Room 502 on 5th Floor of Energy and Environment Building

Session D: Room 501 on 5th Floor of Energy and Environment Building

Poster Session: on 5th Floor of Energy and Environment Building

November 1st (Tue)

Registration and Reception

14:00-22:00 **Registration**

Jin Bai He Hotel

15:00 **ISC Meeting**

"Circle" Meeting Room on 5th Floor of Energy and Environment Building

(Room 501)

18:00-20:00 **Reception**

Jin Bai He Hotel

From Nov 2nd to 4th, the registration desk will be open on 1st Floor of Energy and Environment Building.

November 3rd (Thu)

Banquet

18:00-20:30 **Banquet**

Kylin Villa Hotel (麒麟山庄)

Plenary Session

Major Conference Hall on 1st Floor of Energy and Environment Building

Nov 2nd (Wed) (Major Conference Hall on 1st Floor of Energy and Environment Building)

Chair: Toshiyuki TAKAGI

- 9:00-9:40** **Ageing and Life Management and SNPTC's Practice Covering Full Life**
P-1 **Cycle of NPPs**
Yikang DOU
Chief Engineer and Research Fellow at Shanghai Power Equipment Research Institute
- 9:40-10:20** **Maintenance Science and Technology for Light Water Reactor Safety and**
P-2 **Knowledge Management**
Naoto SEKIMURA
Professor at The University of Tokyo
- 10:20-10:50** **Coffee Break**

Nov 3rd (Thu) (Major Conference Hall on 1st Floor of Energy and Environment Building)

Chair: Yikang DOU

- 8:30-9:10** **Enhance Safety of NPPs and Activities of Japan Society of Maintenance**
P-3 Tadashi NARABAYASHI
Professor at Hokkaido University,
President of Japan Society of Maintenance
- 9:10-9:50** **LCF and HCF of Austenitic Stainless Steels – ND-Monitoring of Physical**
P-4 **Properties to Predict the SN Curve (PHYBAL-Procedure) for Lifetime**
Determination
Gerd DOBMANN
Senior Scientific Consultant and Chair of Nondestructive Testing and Quality Assurance, Saar-University
- 9:50-10:30** **Why Graphite? A Structural Study from the Atomic to Macro Scales.**
P-5 Catherine PAPPAS
Full Professor and Group Leader of 'Neutron and Positron Methods in Materials', Delft University of Technology

Nov 4th (Fri) (Major Conference Hall on 1st Floor of Energy and Environment Building)

Chair: Hendrik SCHUT

- 8:30-9:10** **MD Study of Radiation Effects in Ti-Al Based Structural Intermetallic**
P-6 **Compounds**
Roman VOSKOBOYNIKOV
Senior Scientist at National Research Centre 'Kurchatov Institute',
Head of Department at National Research Nuclear University MEPhI
- 9:10-9:30** **Coffee Break**

November 2nd (Wed) Session WA-1, WA-2, WA-3

Room 504 on 5th Floor of Energy and Environment Building

Session WA-1: Inspection Theory and Method

Chair: Michitsugu MORI

- 10:50-11:20** **Performance Based Maintenance Concept to Optimize Inspection**
WA-1-1 **Frequency**
(Keynote) Masayuki KAMAYA
Institute of Nuclear Safety System, Inc.
- 11:20-11:40** **The PLM of Light Water Reactors after Fukushima Daiichi Accident in**
WA-1-2 **Japan**
(Invited) Masanori KANNO
Central Research Institute of Electric Power Industry
- 11:40-12:00** **Research on the Concrete Steel Cylinder Pipe Corrosion Monitoring by**
WA-1-3 **Fiber Sensor Technology**
Kaixing LIAO, Xianglong KONG, Wenxin TI
Life Management Center, Suzhou Nuclear Power Research Institute
- 12:00-12:20** **Modeling of Distributed Electrical Conductivity in Stress Corrosion**
WA-1-4 **Crack for Simulation of Eddy Current Testing Signals**
Cherdpong JOMDECHA, Wenlu CAI, Shejuan XIE, Zhenmao CHEN
Shaanxi Engineering Research Center of NDT and Structural Integrity Evaluation, State Key Laboratory for Strength and Vibration of Mechanical Structures, Xi'an Jiaotong University
- 12:20-12:40** **Insider Malicious Behaviors Detection and Prediction Technology for**
WA-1-5 **Nuclear Security**
Shi CHEN, Kazuyuki DEMACHI, Tomoyuki FUJITA, Yutaro NAKASHIMA,
Yusuke KAWASAKI
The University of Tokyo

Session WA-2: Inspection Technology - Components

Chair: Tetsuya UCHIMOTO

- 14:00-14:30** **Research on Ultrasonic Inspection of the Forged Main Coolant Line**
WA-2-1 **Welds in Chinese EPR Nuclear Power Plant**
(Keynote) Huaidong CHEN, Lipeng ZHOU, Guanbing MA, Ming LI, Weiqiang WANG
CGNPC Inspection Technology Co. Ltd, Suzhou, China
- 14:30-14:50** **Wearable System for Supporting Field Operation of Nuclear Power Plant**
WA-2-2 Musashi SHIGEYAMA, Kenji OSAKI, Takaki KATO, Yukinori HIROSE
(Invited) *Toshiba Corporation*
- 14:50-15:10** **Delamination Defect Identification for Sandwich Plate with Pyramidal**
WA-2-3 **Truss Cores Based on Vibration Parameters**
Shuxia TIAN¹, Zhenmao CHEN², Jianglei FAN¹, Shongyong WANG¹
1 Mechanical and Electrical Engineering Institute, Zhengzhou University of Light Industry; 2 State Key Laboratory for Strength and Vibration of Mechanical Structures, Xi'an Jiaotong University

15:10-15:30 **Improving Multilevel Flow Models to Fault Diagnosis of HTR-PM**
WA-2-4 Yang TANG, Yangping ZHOU, Dianbin LI, Zhiwei ZHOU, Lei SHI, Yujie DONG
Institute of Nuclear and New Energy Technology, Collaborative Innovation Center of Advanced Nuclear Energy Technology, Key Laboratory of Advanced Reactor Engineering and Safety of Ministry of Education, Tsinghua University

15:30-15:50 **Coffee Break**

Session WA-3: Inspection Technology - Diagnosis

Chair: Masayuki KAMAYA

15:50-16:10 Quantitative Evaluation of Residual Strain in Austenitic Stainless Steels Using
WA-3-1 Eddy Current Testing
Tetsuya UCHIMOTO¹, Toshiyuki TAKAGI¹, Seiya SATO¹, Zhenmao CHEN², Takeshi NUMATA³
1 Institute of Fluid Science Tohoku University; 2 State Key Laboratory for Strength and Vibration of Mechanical Structures, Xi'an Jiaotong University; 3 Nuclear Power Division, The Kansai Electric Power Company, Inc.

16:10-16:30 **Research on Fault Diagnosis Technology of Nuclear Power Station Based
WA-3-2 on Multi-class Twin Support Vector Machine**
Fang YUAN¹, Jiang GUO¹, Bing ZENG¹, Hongyan WU¹
College of Power & Mechanical Engineering, Wuhan University

16:30-16:50 **Comparative Study of Thickness Measurement of Corroded Bent Pipe
WA-3-3** Hongjun SUN¹, Ryoichi URAYAMA², Tetsuya UCHIMOTO², Fumio KOJIMA², Toshiyuki TAKAGI², Hiroshi ABE³, Kunihiro KOBAYASHI⁴
1 Graduate School of Engineering, Tohoku University; 2 Institute of Fluid Science, Tohoku University; 3 Graduate School of Engineering, Tohoku University; 4 Tohoku Electric Power Co. Inc, 1-7-1 Honcho, Aoba, Sendai, Miyagi, 980-8550, Japan

November 2nd (Wed) Session WB-1, WB-2, WB-3

Room 503 on 5th Floor of Energy and Environment Building

Session WB-1: Nuclear Materials for Next Generation Reactors

Chair: Yichu WU

- 10:50-11:20** **Thermal Annealing of C⁺ and He⁺ Ion Implantation Defects in Nuclear**
WB-1-1 **Graphite Studied by Positron Annihilation Doppler Broadening and**
(Keynote) **Thermal Helium Desorption Spectroscopy**
Hendrik SCHUT¹, Zhen HU², Chuanqing SHI², Zhou ZHOU¹, Catherine PAPPAS¹, Zhengcao LI^{2,3}
1 Department of Radiation Science and Technology, Delft University of Technology; 2 State Key Lab of New Ceramic and Fine Processing, School of Materials Science & Engineering, Tsinghua University; 3 Key Laboratory of Advanced Materials (MOE), School of Materials Science & Engineering, Tsinghua University
- 11:20-11:40** **The Compatibility of Zirconium Hydride in a Sodium Environment**
WB-1-2 Xiaogang FU, Haoran MA, Jinquan ZHANG, Bo QIN, Bin LONG
China Institute of Atomic Energy
- 11:40-12:00** **The Research on the Distribution of Primary Knock-on Atoms in PWR**
WB-1-3 **Fuel Clad and Pressure Vessel by Monte Carlo Method**
Hao LI, Bingyan ZHOU, Ganglin YU, Kan WANG
Department of Engineering Physics, Tsinghua University
- 12:00-12:20** **Precision Dilatometer Analysis of Neutron-irradiated Nuclear Graphite**
WB-1-4 **Recovery Process up to 1673 K**
Yuhao JIN^{1,2}, Katsumi YOSHIDA², Zhengcao LI¹, Tadashi MARUYAMA¹, Toyohiko YANO²
1 State Key Laboratory of New Ceramic and Fine Processing, Key Laboratory of Advanced Materials, School of Materials Science & Engineering, Tsinghua University; 2 Laboratory for Advanced Nuclear Energy, Institute of Innovative Research, Tokyo Institute of Technology
- 12:20-12:40** **Chemical Compatibility between Boron Carbide and 316Ti Stainless Steel**
WB-1-5 **in Sodium Environment**
Bo QIN, Xiaogang FU, Liqing HAN, Xiping SU, Chen HUANG, Bin LONG
China Institute of Atomic Energy

Session WB-2: Micro-structural Evolution of Nuclear Materials

Chair: Chi ZHANG

- 14:00-14:30** **Positron Annihilation Study of Proton and Ion Irradiated RPV Steels**
WB-2-1 Yichu WU
(Keynote) *School of Physics and Technology, Wuhan University*
- 14:30-14:50** **Single Thermal Field and Hot Isostatic Pressure Assisted Microstructure**
WB-2-2 **Deformation Mechanisms in Quasi-Brittle Nuclear Graphite**
(Invited) Longkui ZHU, Zhengcao LI
School of Materials Science and Engineering, Tsinghua University

- 14:50-15:10** **Positron Annihilation and Nano-indentation Analysis of Irradiation**
WB-2-3 **Effects on Microstructure of A508-3 Steels Used in Chinese HTGR**
 Tianci ZHANG¹, Zhengcao LI², Hendrik SCHUT³ and Haitao WANG¹
1 Institute of Nuclear and New Energy Technology, Tsinghua University;
2 School of Materials Science and Engineering, Tsinghua University;
3 Department of Radiation Science and Technology, Delft University of
Technology
- 15:10-15:30** **3D CFD and FEM Evaluations of RPV Stress Intensity Factor during PTS**
WB-2-4 **Loading**
 Xiaoyong RUAN¹, Toshiki NAKASUJI¹, Kazunori MORISHITA²
1 Graduate School of Energy Science, Kyoto University;
2 Institute of Advanced Energy, Kyoto University

15:30-15:50 **Coffee Break**

Session WB-3: Stress and Cracking

Chair: Ben XU

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- 15:50-16:10** **Microstructure Evolution and Yield Strength Simulation in CLAM Steel**
WB-3-1 Chi ZHANG, Chenchong WANG, Zhigang YAN, Hao CHEN
(Invited) *Key Laboratory of Advanced Materials of Ministry of Education, School of*
Materials Science and Engineering, Tsinghua University
- 16:10-16:30** **Proposal of Failure Mode Map under Seismic Loading – Ratcheting and**
WB-3-2 **Collapse**
 Md Abdullah Al BARI, Ryota SAKEMI, Takuya SATO, Naoto KASAHARA
The University of Tokyo
- 16:30-16:50** **Mechanisms and Protection of Stress Corrosion Cracking in Pressured**
WB-3-3 **Water Reactors**
 Longkui ZHU^{1,2}, Zhengcao LI¹, Lijie QIAO²
1 School of Materials Science and Engineering, Tsinghua University;
2 Corrosion and Protection Center, University of Science and Technology
Beijing

November 2nd (Wed) Session WC-1, WC-2, WC-3

Room 502 on 5th Floor of Energy and Environment Building

Session WC-1: Maintenance Theory and Program

Chair: Fumio KOJIMA

- 10:50-11:20** **Seawater Intrusion Event Consequence Assessment for RPV and Core**
WC-1-1 **Internals, Hamaoka NPS Unit5**
(Keynote) Tomiyasu IMAI, Kouhei KURONO, Kouji YAMADA, Takanori NAGURA
Chubu Electric Power Co., Inc.
- 11:20-11:40** **Reactivity Measurement Based on a New Finite-Time Convergent**
WC-1-2 **2-Order Differentiator**
Zhe DONG, Xiaojin HUANG
*Institute of Nuclear and New Energy Technology, Collaborative Innovation
Center of Advanced Nuclear Energy Technology, Tsinghua University*
- 11:40-12:00** **The R&D Programs of Maintenance Technology for FBR Monju Using**
WC-1-3 **the Sodium Engineering Research Facility**
Koichi SARUTA, Toshihiko YAMAGUCHI, Masashi UEDA
Japan Atomic Energy Agency
- 12:00-12:20** **Education and training for a wider application of atom probe tomography**
WC-1-4 **in reactor ageing management**
Dongyue CHEN¹, Kenta MURAKAMI², Kenji DOHI³, Kenji NISHIDA³,
Naoki SONEDA³, Zhengcao LI⁴, Li LIU¹, Naoto SEKIMURA¹
*1 Department of Nuclear Engineering and Management, School of
Engineering, The University of Tokyo; 2 Nuclear Professional School, School
of Engineering, The University of Tokyo; 3 Central Research Institute of
Electric Power Industry; 4 School of Materials Science and Engineering,
Tsinghua University*

Session WC-2: Maintenance Technology

Chair: Hiroshi ABE

- 14:00-14:30** **Analysis, Evaluation and Optimization of Temperature for Reactor**
WC-2-1 **Pressure Vessel Support**
(Keynote) Dongan LIU, Ying LV
Shanghai Nuclear Engineering Research & Design Institute
- 14:30-14:50** **Thermal Management of Heat Resistant FBGs Sensing for High**
WC-2-2 **Temperature Industrial Plants**
Akihiko NISHIMURA¹, Yusuke TAKENAKA², Akinori FURUSAWA¹,
Kazuhiro TORIMOTO¹, Masashi UEDA³, Naoaki FUKUDA⁴, Kazuyuki
HIRAO⁵
*1 Applied Laser Technology Institute, Japan Atomic Energy Agency; 2 A-tech
Co., Ltd.; 3 Monju Project Management and Engineering Center, Japan
Atomic Energy Agency; 4 Office of Society-Academia Collaboration for
Innovation, Kyoto Univ.; 5 Fac. of Eng. and Nano-Technology Hub, Kyoto
Univ.*

14:50-15:10 **Development of high durable lining material to prevent damages of sea water system piping**
WC-2-3

Ryota TAKEUCHI¹, Yuji KONDO¹, Tomokazu IWATA¹, Shunsuke TANAKA¹, Hiroshi MATSUZAWA¹, Yasuharu SUDA²

1 Mitsubishi Heavy Industry Co., Ltd.;

2 MHI Solution Technologies Co., Ltd.

15:10-15:30 **Development of High-Efficiency Adsorbents for Organic Iodine Removal**
WC-2-4

Jifeng WANG, Yoshihiro ISHIKAWA, Yuichiro UZUYAMA, Toshiki KOBAYASHI, Koji ENDO

Rasa Industries, Ltd.

15:30-15:50 **Coffee Break**

Session WC-3: Maintenance Technology

Chair: Akihiko NISHIMURA

15:50-16:10 **Applicability Study of Laser Beam Butt Welding for Pipe Structure**

WC-3-1 **Maintenance with Ultrasonic Guided Wave**

Akinori FURUSAWA¹, Akihiko NISHIMURA¹, Kazuhiro TORIMOTO², Yusuke TAKENAKA³, Ryoji TOYAMA⁴, Hiroyuki NAKAMOTO⁵

1 Applied Laser Technology Institute, Japan Atomic Energy Agency; 2

NIPPON ADVANCED TECHNOLOGY Co., Ltd.; 3 A-tech Co., Ltd.; 4 Sanritz Automation Co, Ltd.; 5 Graduate School of System Informatics, Kobe Univ.

16:10-16:30 **A Combined Bead Surface and Temperature Profiles Analysis for Temper**
WC-3-2 **Bead Welding Technique**

T. KASHIYAMA, S. OKANO, M. MOCHIZUKI

Graduate School of Engineering, Osaka University

16:30-16:50 **Characteristics of Scalloped Appearance and Its Relation to FAC Rate of**
WC-3-3 **Carbon Steel Piping Elbow**

Hiroshi ABE¹, Syuhei KAWAGUCHI¹, Yutaka WATANABE¹, Makoto NAKASHIMA², Tadashi TATSUKI²

1 Graduate School of Engineering, Tohoku University;

2 Research and Development Center, Tohoku Electric Power

November 2nd (Wed) Session WD-1, WD-2, WD-3

Room 501 on 5th Floor of Energy and Environment Building

Session WD-1: Advanced Nuclear Fuels

Chair: Satoshi YANAGIHARA

10:50-11:20 **Current Status of Research and Development of FeCrAl-ODS Steels for
WD-1-1** **Accident Tolerant Fuel Application**

(Keynote) Peng DOU¹, Akihiko KIMURA²

1 School of Materials Science and Engineering, Chongqing University

2 Institute of Advanced Energy, Kyoto University

11:20-11:40 **Study on the Fretting Wear Behavior of Fuel Rod Cladding**

WD-1-2 Jinna MEI, Fei XUE, Chaoliang XU, Qunjia PENG

Suzhou Nuclear Power Research Institute

11:40-12:00 **Preliminary Views on ATF Research**

WD-1-3 Ruirui ZHAO, Ying MENG

China North Nuclear Fuel Co., Ltd.

12:00-12:20 **Effect on Microstructure in Zr-1Nb-0.1Cu Alloy under Heavy Ion**

WD-1-4 **Irradiation**

Yanwei ZHANG, Rongshan WANG, Guanghai BAI, Erwei LIU, Chenxi DU

Suzhou Nuclear Power Research Institute

Session WD-2: Inspection Strategies

Chair: Peng DOU

14:00-14:30 **Safety and Standardization Issues of Nuclear Power Plants in Design and
WD-2-1** **Operation on ISO12100 of Safety Design Principle**

(Keynote) Michitsugu MORI

Graduate School of Engineering, Hokkaido University

14:30-15:00 **Toward Effective Nuclear Power Plant Ageing Management - On the
WD-2-2** **Second Revision of the AESJ Code**

(Keynote) Masahide SUZUKI¹, Nobuyuki NAKAGAWA², Shingo ITO², Takayuki
MATSUFUJI³, Masao UESAKA⁴, Takashi HOJO⁵, Ichiro TAMURA⁶, Naoto
SEKIMURA⁷

*1 Nagaoka University of Technology; 2 Nuclear Engineering, Ltd.; 3 Tokyo
Electric Power Services Co., Ltd.; 4 Tokyo Electric Power Company Holdings,
Inc.; 5 The Kansai Electric Power Co., Inc.; 6 The Chugoku Electric Power
Co., Inc.; 7 The University of Tokyo*

15:00-15:20 **Japanese PD examinations for depth sizing of SCC in austenitic stainless
WD-2-3** **steel pipes from 2006 to 2015**

(Invited) Keiji WATANABE, Shan LIN, Hajime SHOHJI, Joji OHTA

PD Center, Central Research Institute of Electric Power Industry

15:20-15:40 **R&D of Multi-Frequency ECT Algorithms for FBR SG Tubes**

WD-2-4 Ovidiu MIHALACHE, Toshihiko YAMAGUCHI, Takuma SHIRAHAMA,

(Invited) Masashi UEDA

15:40-15:50 Coffee Break

Session WD-3: Inspection Strategies

Chair: Ovidiu MIHALACHE

**15:50-16:20 Ageing Management Solutions for Corrosion Fatigue Analysis and
WD-3-1 Fatigue Monitoring**

(Keynote) Helmut NOPPER, Jürgen RUDOLPH

AREVA GmbH, IBGSL, D-91058 Erlangen, Germany

**16:20-16:40 Mathematical Modeling of Guided Wave Inspection for Illumination
WD-3-2 Pillar**

(Invited) Fumio KOJIMA¹, Hiroyuki NAKAMOTO², Daichi NAKAMURA²

1 Institute for Fluid Science, Tohoku University;

2 Graduate School of System Informatics, Kobe University

**16:40-17:00 Development of Ultrasonic Phased Array Testing Techniques for
WD-3-3 Acoustical Anisotropic Media**

Naoyuki KONO

Research & Development Group, Hitachi, Ltd.

November 4th (Fri) Session FA-1, FA-2, FA-3, FA-4

Room 504 on 5th Floor of Energy and Environment Building

Session FA-1: Inspection Technology – X-Ray, Laser and Acoustic

Chair: Hongmei LI

- 9:30-9:50** **Proposal of Direct Method for Stress Measurement Using X-ray Area**
FA-1-1 **Detector**
(Invited) Kenji SUZUKI
Niigata University
- 9:50-10:10** **Imaging and Depth Evaluation of Surface Cracks with Laser Array Spot**
FA-1-2 **Thermography**
Cuixiang PEI, Jinxing QIU, Haocheng LIU, Zhenmao CHEN
Xi'an Jiaotong University
- 10:10-10:30** **X-ray Evaluation of Depth-Directional Distribution of Residual Stress**
FA-1-3 **within Surface Machined Layer Induced by Surface Machining and**
Sequential Welding
Y. TANIGUCHI, S. OKANO, M. MOCHIZUKI
Graduate School of Engineering, Osaka University
- 10:30-10:50** **Disbonding Defects Inspection in Multi-Layered Conductive Structures**
FA-1-4 **with a Mini Resonant EMAT**
Tianhao LIU, Cuixiang PEI, Siqu ZHAO, Zhenmao CHEN
State Key Laboratory for Strength and Vibration of Mechanical Structures,
Xi'an Jiaotong University, Shaanxi Engineering Research Center of NDT and
Structural Integrity Evaluation
- 10:50-11:10** **Coffee Break**

Session FA-2: Inspection Technology – Acoustic

Chair: Cuixiang PEI

- 11:10-11:30** **Vibration Analysis of High Pressure Cylinder Inlet Steam Pipe During**
FA-2-1 **Turbine Startup in Nuclear Power Plant**
Lei LIN¹, Xiangxiang DONG², Decheng XU¹, Fei XUE¹, Xiaofeng SONG¹
1 Suzhou Nuclear Power Research Institute, Ltd.
2 Yangjiang Nuclear Power Plant
- 11:30-11:50** **Development of Ultrasonic Underwater Imaging Techniques Using**
FA-2-2 **Convex Array Transducer**
Naoyuki KONO, Hayato MORI
Hitachi, Ltd. Research & Development Group
- 11:50-12:10** **Study of Inner Defects Testing with Ring Laser-EMAT Ultrasonic Method**
FA-2-3 Dongchi YI^{1,2}, Cuixiang PEI², Zhenmao CHEN^{1,2}
1 State Key Laboratory for Strength and Vibration of Mechanical Structures,
Xi'an Jiaotong University; 2 Shanxi Engineering Research Center of NDT and
Structural Integrity Evaluation
- 12:10-12:30** **In-service Inspection for Steam Generator of Integrated Reactor**

FA-2-4 Qin ZHOU, Xiaoxin WANG, Xiongbing LIU, Yan XIA, Xiaotian LI
Institute of Nuclear and New Energy Technology, Tsinghua University

Session FA-3: Inspection Technology – Magnetic Signals, Neutron and Component

Chair: Kenji SUZUKI

14:00-14:20 Analysis of Metal Magnetic Memory Signals Based on Reconstruction

FA-3-1 Algorithm

(Invited) Hongmei LI¹, Zhenmao CHEN²

1 School of Mechanical Engineering, Beifang University of Nationalities;

2 State Key Laboratory for Strength and Vibration of Mechanical Structures,

Xi'an Jiaotong University

14:20-14:40 The Composite Pipe Applied in Nuclear Power Plants

FA-3-2 Shuangxi WANG, Wenjun WANG

(Invited) *College of Engineering, Shantou University*

14:40-15:00 Quantitative Profile Evaluation of Delamination by Inversion Scheme

FA-3-3 Using Phase Signals in Infrared Thermography

Haochen LIU, Jinxing QIU, Cuixiang PEI, Shejuan XIE, Zhenmao CHEN

State Key Laboratory for Strength and Vibration of Mechanical Structures,

Xi'an Jiaotong University

15:00-15:20 Neutron Radiography Method under High Gamma-ray Environment

FA-3-4 Using Dysprosium Foil

Kohichi NAKAYAMA, Syuji YAMAMOTO

Toshiba Corporation

15:20-15:40 Coffee Break

Session FA-4: Micro-structural Evolution of Nuclear Materials

Chair: Masahide SUZUKI

15:40-16:00 Synergy Effect of Ion Irradiation and Oxidation on Nuclear Graphite

FA-4-1 Mingyang LI^{1,3}, Leimin ZHANG⁴, Hendrik SCHUT⁵, Zhengcao LI^{1,2}

1 The State Key Laboratory of New Ceramics and Fine Processing, School of

Materials Science and Engineering, Tsinghua University; 2 Key Laboratory of

Advanced Materials (MOE), School of Materials Science and Engineering,

Tsinghua University; 3 Institute of Technical Physics, Department of

Engineering Physics; 4 China North Nuclear Fuel Co., Ltd.; 5 Department of

Radiation Science and Technology, Delft University of Technology

16:00-16:20 Simulations of Irradiated-enhanced Segregation and Phase Separation in

FA-4-2 Fe-Cu-Mn Alloys

Boyan LI¹, Zhengcao LI¹, Ben XU, Wei LIU¹, Chuck HENAGER², Shenyang HU²

1 School of Materials Science and Engineering, Tsinghua University;

2 Pacific Northwest National Laboratory

16:20-16:40 Degradation Behaviors of Phthalocyanine/PAN Composites under 100

FA-4-3 keV Proton Irradiation

Yiyong WU¹, Chunyan ZUO¹, Chengyue SUN², Yu LIU¹, Jingdong

XIAO¹, Li WANG³, Ying CHEN³, Xiaoqin HUANG³

*1 School of Materials Science & Engineering, Harbin Institute of Technology; 2 School of Science, Harbin Institute of Technology;
3 Qian Xuesen Laboratory of Space Technology*

November 4th (Fri) Session FB-1, FB-2, FB-3, FB-4

Room 503 on 5th Floor of Energy and Environment Building

Session FB-1: RPV Steel and Characterization – TEM and Nano Indentation

Chair: Junji ETOH

9:30-9:50 **Improvement of In-situ Transmission Electron Microscope Technique for
FB-1-1** **Visualization of Cascade Damage**

(Invited) Kenta MURAKAMI¹, Dongyue CHEN², Hiroaki ABE¹, Naoto SEKIMURA²

*1 Nuclear Professional School, School of Engineering, The University of
Tokyo;*

*2 Department of Nuclear Engineering & Management, School of Engineering,
The University of Tokyo*

9:50-10:10 **Evaluation of Hardening under Ion Irradiation in Reactor Pressure Vessel
FB-1-2** **Model Alloys by Nano-indentation Techniques**

Liang CHEN^{1,2}, Kenji NISHIDA³, Kenta MURAKAMI⁴, Tomohiro
KOBAYASHI², Dongyue CHEN¹, Zhengcao LI⁵, Naoto SEKIMURA¹

*1 Department of Nuclear Engineering and Management, School of
Engineering, The University of Tokyo; 2 Central Research Institute of Electric
Power Industry; 3 Central Research Institute of Electric Power Industry; 4
Nuclear Professional School, School of Engineering, The University of Tokyo;
5 School of Materials Science and Engineering, Tsinghua University*

10:10-10:30 **Study of in-situ TEM Observation of Dislocation Channel Formation in
FB-1-3** **Tensile Test for Ion-Irradiated Stainless Steels**

M. MATSUBARA¹, K. TOUGOU¹, T. ONITSUKA², R. ISHIGAMI³ and K.
FUKUMOTO²

*1 Univ. of FUKUI; 2 RINE/Univ. of FUKUI; 3 The WAKASA WAN Energy
Research Center*

10:30-10:50 **Utilization of Japanese RPV surveillance materials for human resource
FB-1-4** **development**

Kenta MURAKAMI¹, Dongyue CHEN², Kenji NISHIDA³, Katsuhiko FUJII⁴

*1 Nuclear Professional School, School of Engineering, The University of
Tokyo; 2 Department of Nuclear Engineering & Management, School of
Engineering, The University of Tokyo; 3 Central Research Institute of Electric
Power Industry; 4 Institute of Nuclear Safety System, Incorporated*

10:50-11:10 **Coffee Break**

Session FB-2: Performance of Nuclear Materials

Chair: Kenta MURAKAMI

11:10-11:30 **Investigation on Electronic, Mechanical and Thermal Properties of Hf–H
FB-2-1** **System**

(Invited) Hao WANG¹, Kenji KONASHI²

1 School of Materials Science and Engineering, Shanghai University;

2 International Research Center for Nuclear Materials Science, Institute for

Materials Research, Tohoku University

11:30-11:50 **Hydrogen Permeation Characteristic of Nanoscale Passive Films Formed**
FB-2-2 **on Different Zirconium Alloys**

Cheng ZENG, Yunhan LING, Yakui BAI

Key Laboratory of Advanced Materials of Ministry of Education, School of Materials Science and Engineering, Tsinghua University

11:50-12:10 **Oxidation Behaviour of Nuclear Graphites for High Temperature**
FB-2-3 **Gas-Cooled Reactor**

Rui YAN¹, Zhengcao LI^{2,*}, Dongyue CHEN¹, Mingyang LI^{1,3}

1 State Key Lab of New Ceramic and Fine Processing, School of Materials Science & Engineering, Tsinghua University; 2 Key Laboratory of Advanced Materials (MOE), School of Materials Science & Engineering, Tsinghua University; 3 Dept. of Engineering Physics, Tsinghua University

12:10-12:30 **Influence of the cladding on the fast fracture assessment of the reactor**
FB-2-4 **pressure vessel**

Mingya CHEN, Weiwei YU, Feng LU, Fei XUE, Zhilin CHEN

Suzhou Nuclear Power Research Institute

12:30-12:50 **Cr interaction with SIA dislocation loops in bcc iron**

FB-2-5 Xiaoyang WANG, Zhengcao LI, Ben XU, Wei LIU

Key Laboratory of Advanced Materials (MOE), School of Material Science and Engineering, Tsinghua University

Session FB-3: Corrosion and Fatigue

Chair: Qunjia PENG

14:00-14:20 **Influence of Stress Improvement Process and Thermal Aging Treatment**
FB-3-1 **on Resistance to Intergranular Corrosion in Shielded Metal Arc Weld**
(Invited) **Metal for Type 600 Nickel Base Alloy**

Satoru NISHIKAWA¹, Koichi OOI², Makoto TAKAHASHI³

1 Japan Power Engineering and Inspection Corporation; 2 Shibaura Institute of Technology; 3 Joining and Welding Research Institute, Osaka University

14:20-14:40 **Corrosion Behavior of Oxide Film Formed on N18 in 300 °C**

FB-3-2 **LiOH-H₃BO₃ Water after Krypton Irradiation**

Yakui BAI¹, Yunhan LING², Zhiyuan XIN², Cheng ZENG², Wensheng LAI²

1 State Power Investment Corporation Central Research Institute (SPICRI); 2 School of Materials Science and Engineering, Tsinghua University

14:40-15:00 **Radiation Effect and SCC Behavior of Oxide Dispersion Strengthened**
FB-3-3 **Austenitic Stainless Steels**

Takahiro ISHIZAKI¹, Yusaku MARUNO¹, Kiyohiro YABUUCHI², Sosuke KONDO², Akihiko KIMURA²

1 Research & Development Group, Hitachi, Ltd.; 2 Institute of Advanced Energy, Kyoto University

15:00-15:20 **Environmentally Assisted Fatigue Behaviors and Safety Evaluation of**
FB-3-4 **Domestic Forging Primary Pipe Stainless Steel**

Kewei FANG, Chengtao LI, Fei XUE

Life Management Center, Suzhou Nuclear Power Research Institute

15:20-15:40 Coffee Break

Session FB-4: Corrosion and Fatigue

Chair: Yunhan LING

15:40-16:10 Effect of Electropolishing on Corrosion of Alloy 600 in High Temperature

FB-4-1 Water

(Keynote) Qunjia PENG^{1,2}, Yaolei HAN², Jinna MEI¹, En-Hou HAN², Wei KE²

1 Key Laboratory of Nuclear Materials and Safety Assessment, Institute of Metal Research, Chinese Academy of Sciences;

2 Suzhou Nuclear Power Research Institute

16:10-16:30 Environmental Compatibility Evaluation of EHP (Extra High Purity)

FB-4-2 Austenitic Stainless Steel Cladding Material

(Invited) Junji ETOH¹, Takaki ASHIDA¹, Takamasa OCHIAI¹, Kiyoshi KIUCHI¹, Masayuki TAKIZAWA¹, Junpei NAKAYAMA²

1 Mitsubishi Research Institute, Inc.; 2 Kobe Steel, Ltd.

16:30-16:50 The Studies of Irradiation Assisted Stress Corrosion Cracking on Reactor

FB-4-3 Internals Stainless Steel under Xe Irradiation

Chaoliang XU, Guodong ZHANG, Lu ZHANG, Jinna MEI, Wangjie QIAN, Xiangbing LIU

Suzhou Nuclear Power Research Institute

November 4th (Fri) Session FC-1, FC-2, FC-3, FC-4

Room 502 on 5th Floor of Energy and Environment Building

Session FC-1: Decommissioning Theory and Technology

Chair: Tomoki SAKAUE

- 9:30-9:50** **Overview of the Fundamental Research and Human Resource**
FC-1-1 **Development for the Decommissioning of Fukushima Daiichi Nuclear**
(Invited) **Power Station in Japan**
Yutaka WATANABE¹, Takayuki AOKI¹, Yuichi NIIBORI¹, Toru OBARA²,
Isamu SATO², Saishun YAMAZAKI², Koji OKAMOTO³, Shunichi
SUZUKI³, Yusuke TAMURA³
*1 Tohoku University; 2 Tokyo Institute of Technology; 3 The University of
Tokyo*
- 9:50-10:10** **Research and Human Resource Development for Decommissioning**
FC-1-2 **Technology of Fukushima Daiichi Nuclear Power Plants**
Y. ANODA¹, M. UNO¹, S. YANAGIHARA¹, K. FUKUMOTO¹, Y. IGUCHI¹,
D. KAWASAKI¹, K. SUZUKI², M. KAWAI², T. NANIWA², T. SUNAGAWA³,
E. MINEHARA⁴
*1 RINE/Univ. of FUKUI; 2 Univ. of FUKUI; 3 FUKUI Univ. of Technol.; 4
The WAKASA WAN Energy Research Center*
- 10:10-10:30** **Decommissioning Engineering Support Systems Based on 3D CAD**
FC-1-3 **Models**
Hiroshi SEKI¹, Atsuko ENOMOTO, Mitsutaka IMAMURA, Takashi
KITAHARA³
*1 Center for Technology Innovation - Energy, Research & Development
Group, Hitachi, Ltd.; 2 Center for Technology Innovation – Production
Engineering, Research & Development Group, Hitachi, Ltd.; 3 Hitachi-GE
Nuclear Energy, Ltd.*
- 10:30-10:50** **Study on Risk Management in the Decommissioning of Accident-damaged**
FC-1-4 **Nuclear Power Plants**
Takayuki AOKI, Yutaka WATANABE
Tohoku University
- 10:50-11:10** **Coffee Break**

Session FC-2: Decommissioning Method and Equipment

Chair: Ken-ichi FUKUMOTO

- 11:10-11:30** **Survey of Apparatus Hatch in Fukushima Daiichi NPS Using**
FC-2-1 **Remotely-Controlled Robot**
(Invited) Tomoki SAKAUE¹, Shin YOSHINO¹, Koju NISHIZAWA¹, Kohei TAKEDA¹
Tokyo Electric Power Company Holdings
- 11:30-11:50** **Development of the Remote Decontamination Robot “MHI-MEISter**
FC-2-2 **II” for an Upper Floor of Reactor Building in Fukushima Daiichi NPP**
Leona MORIKAWA, Tatsuya HASHIMOTO, Noriaki SHIMONABE,

Masahiro YANO, Hironori ONITSUKA, Jun FUJITA
Mitsubishi Heavy Industries, Ltd.

11:50-12:10 **Development of Work Time Calculation Model for Dismantling Reactor**
FC-2-3 **Components of a Large-Scale NPP Based on the Records Obtained**
through JPDR Decommissioning Project

Haruka OKUDE, Daisuke KAWASAKI, Satoshi YANAGIHARA
University of Fukui

12:10-12:30 **Localization of Radiation Sources Using Gamma-ray Detector in**
FC-2-4 **Simulated Environments**

Doyeon KIM, Hanwool WOO, Yonghoon JI, Yusuke TAMURA, Atsushi
YAMASHITA, Hajime ASAMA
*Department of Precision Engineering, School of Engineering, The University
of Tokyo*

12:30-12:50 **Radioactivity Inventory Evaluation and Waste Characterization of**
FC-2-5 **Dismantled Reactor Components**

Jumpei TAKAHASHI, Daisuke KAWASAKI, Satoshi YANAGIHARA
University of Fukui

Session FC-3: Decommissioning – Waste Disposal

Chair: Takayuki AOKI

14:00-14:20 **Treatment of Spent Radioactive Cationic Exchange Resins Used in**
FC-3-1 **Nuclear Power Plants by Fenton-like Oxidation Process**

(Invited) Lejin XU¹, Zengguang SU¹, Jun YANG¹, Zhong WAN², Jianlong WANG²
*1 Nuclear Engineering and Technology Department, School of Energy and
Power Engineering, Huazhong University of Science & Technology;*
*2 Collaborative Innovation Center for Advanced Nuclear Energy Technology,
INET, Tsinghua University*

14:20-14:40 **Microstructure Evolution of B₄C-Al Composites during Fabrication**
FC-3-2 **Process by Liquid Stirring**

Shangyang FENG, Jiyun ZHENG, Qiulin LI
Graduate School at Shenzhen, Tsinghua University

14:40-15:00 **Mesoscale Numerical Simulation of Ion Diffusion in Cement**
FC-3-3

Yuankai YANG, Xinting He, Moran WANG
Department of Engineering Mechanics and CNMM, Tsinghua University

15:00-15:20 **Corrosion Behavior of E355CC Weld Joints in Simulated Groundwater**
FC-3-4

Kewei GAO, Chao LIU, Quanlin LIU
University of Science and Technology Beijing

15:20-15:50 **Coffee Break**

November 4th (Fri) Session FD-1, FD-2, FD-3, FD-4

Room 501 on 5th Floor of Energy and Environment Building

Session FD-1: Micro-structure and Modelling

Chair: Roman VOSKOBOYNIKOV

- 9:30-10:00** **Numerical Simulation of micro-EDM Model of Ti-6Al-4V**
FD-1-1 Satyananda PANDA
(Keynote) *Department of Mathematics, National Institute of Technology Calicut*
- 10:00-10:20** **Interstitial/Substitute Doped Dislocation Core Structures in bcc Materials**
FD-1-2 Yinan WANG, Zhengcao LI, Ben XU, Wei LIU
Key Laboratory of Advanced Materials (MOE), School of Material Science and Engineering, Tsinghua University
- 10:20-10:40** **A Comprehensive Solution to Miniaturized Tensile Testing: Sample Geometric Design and Extraction of Constitutive Behaviors Using Inverse FEM Simulations**
FD-1-3 **(Invited)**
Haiting LIU^{1,2}, Yao SHEN^{1,2}, Shuang YANG³, Pengfei ZHENG³, Lei ZHANG⁴
1 The State Key Lab of Metal Matrix Composites, Shanghai Jiao Tong University; 2 Shanghai Key Laboratory of Advanced High-temperature Materials and Precision Forming, Shanghai Jiao Tong University; 3 Southwest Institute of Physics; 4 Institute of Natural Sciences, Shanghai Jiao Tong University
- 10:40-11:00** **The First Structures from PEARL in Delft: Argyrodite Li Electrolytes and Cesium Molybdenates as Fission Products**
FD-1-4 Lambert VAN EIJCK
Department of Radiation Science and Technology, Delft University of Technology
- 11:00-11:10** **Coffee Break**

Session FD-2: Micro-structure and Modelling

Chair: Yan-Bing HE

- 11:10-11:40** **Using Radiation Methods and Modeling Techniques to Understand Critical Processes in Next Generation Batteries**
FD-2-1 **(Keynote)**
Zhaolong LI¹, Chuang YU¹, Niek J.J. de KLERK¹, Swapna GANAPATHY¹, Martijn VAN HULZEN¹, Irek ROSLON¹, Jouke HERINGA¹, Ernst R.H. VAN ECK², Arno P.M. KENTGENS², Jonathan P. WRIGHT³, Niels H. VAN DIJK¹, Fokko. M. MULDER¹, Marnix WAGEMAKER¹
1 Delft University of Technology; 2 Radboud University Nijmegen; 3 European Synchrotron Radiation Facility
- 11:40-12:00** **Ultra Thin Silicon Anode Lithium Ion Battery Modified by LiPON**
FD-2-2 Xinyi LUO, Zhengcao LI
Key Laboratory of Advanced Materials of Ministry of Education, School of Materials Science and Engineering, Tsinghua University

- 12:00-12:20** **A Dense Coating of Li₄Ti₅O₁₂ Embedded in Graphene on the Separator**
FD-2-3 **for High Performance Lithium-Sulfur Battery**
 Yan ZHAO^{1,2}, Ming LIU^{1,2}, Wei LV¹, Yan-Bing HE¹, Chao WANG^{1,2}, Qinbai YUN^{1,2}, Baohua LI¹, Feiyu KANG^{1,2}, Quanhong YANG^{1,3}
1 Shenzhen Key Laboratory for Graphene-Based Materials and Engineering Laboratory for Functionalized Carbon Materials, Graduate School at Shenzhen, Tsinghua University; 2 Laboratory of Advanced Materials, School of Materials Science and Engineering, Tsinghua University; 3 School of Chemical Engineering and Technology, Tianjin University
- 12:20-12:40** **Iron Oxide Nanoconfined in Carbon Nanopores as High Capacity Anode**
FD-2-4 **for Rechargeable Alkaline Batteries**
 Danni LEI^{1,2}, Alexandre MAGASINSKI¹, Dong-Chan LEE¹, Enbo ZHAO¹, Gleb YUSHIN¹
1 School of Materials Science & Engineering, Georgia Institute of Technology; 2 Shenzhen Key Laboratory for Graphene-based Materials and Engineering Laboratory for Functionalized Carbon Materials, Graduate School at Shenzhen, Tsinghua University
- 12:40-13:00** **Commercial Carbon Molecular Sieves as a High Performance Anode for**
FD-2-5 **Sodium-Ion Batteries**
 Siwei ZHANG^{1,2}, Wei LV¹, Chong LUO^{1,2}, Feiyu KANG^{1,2}, Quan-Hong YANG^{1,3}
1 Shenzhen Key Laboratory for Graphene-based Materials and Engineering Laboratory for Functionalized Carbon Materials, Graduate School at Shenzhen, Tsinghua University; 2 Laboratory of Advanced Materials, School of materials science and Engineering, Tsinghua University; 3 School of Chemical Engineering and Technology, Tianjin University

Session FD-3: Micro-structure and Modelling

Chair: Marnix WAGEMAKER

- 14:00-14:20** **Carbon Materials Based Flexible Electrodes for Wearable Energy Storage**
FD-3-1 Liubing DONG^{1,2}, Wenbao LIU¹, Chengjun XU¹ * and Feiyu KANG¹ *
1 Graduate School at Shenzhen, Tsinghua University;
2 School of Materials Science and Engineering, Tsinghua University
- 14:20-14:40** **A Highly-safe Lithium-ion Sulfur Polymer Battery with SnO₂ Anode and**
FD-3-2 **Acrylate-based Gel Polymer Electrolyte**
 Ming LIU^{1,2}, Dong ZHOU¹, Feiyu KANG¹, Tianshou Zhao²
1 Engineering Laboratory for the Next Generation Power and Energy Storage Batteries, Graduate School at Shenzhen, Tsinghua University;
2 Department of Mechanical and Aerospace Engineering, Hong Kong University of Science and Technology
- 14:40-15:00** **Silicon/Carbon Composites with Hierarchical Porous Structure as Anode**
FD-3-3 **Materials for Lithium-Ion Batteries (124)**
 Xianying QIN^{1,2}, Yan-Bing HE¹, Baohua LI¹, Jang-Kyo KIM², Feiyu Kang¹
1 Graduate School at Shenzhen, Tsinghua University; 2 Department of

Mechanical and Aerospace Engineering, The Hong Kong University of Science and Technology

15:00-15:20 **Porous Silicon Nanowires Based Highly-sensitive NO₂ Gas Sensors at Room Temperature**
FD-3-4

Jiecu LIAO¹, Zhengcao LI²

1 State Key Laboratory of New Ceramics and Fine Processing, School of Materials Science and Engineering, Tsinghua University;

2 Key Laboratory of Advanced Materials (MOE), School of Materials Science and Engineering, Tsinghua University

15:20-15:40 **Coffee Break**

Session FD-4: Micro-structure and Modelling

Chair: Yao SHEN

15:40-16:10 **A Novel E-mode GaN HEMT**

FD-4-1 Hongyu YU

(Keynote) *Department of Electrical and Electronic Engineering, Southern University of Science and Technology*

16:10-16:40 **The New Progress of Flexible Electronics in Display**

FD-4-2 Honglong NING^{1,2}, Yong ZENG¹, Zeke ZHENG¹, Hongke ZHANG¹,
(Keynote) Zhiqiang FANG¹, Xianzhe LIU¹, Wei CAI¹, Rihui YAO^{1*}, Miao XU¹, Lei
WANG¹, Linfeng LAN¹, Junbiao PENG¹

1 Institute of Polymer Optoelectronic Materials and Devices, State Key Laboratory of Luminescent Materials and Devices, Department of Materials Science and Engineering School, South China University of Technology;

2 State Key Laboratory of Luminescence and Applications

Poster Session

- Poster-1** **Changes in Magnetic, Electric Properties and Mechanical Properties of Neutron Irradiated Reactor Pressure Vessel Steels**
Chengliang LI
China General Nuclear Power Corporation
- Poster-2** **Corrosion Property Changes after Xe Ion Irradiation in Zirconium Alloys of Cladding**
Zhengcao LI¹, Zhenan ZHU^{2,3}
1 Tsinghua University, School of Materials Science and Engineering;
2 Department of Engineering Physics, Tsinghua University;
3 China Jianzhong Nuclear Fuel Co., Ltd.
- Poster-3** **Influnces of Non-Coaxial Magnetic Field on Magnetomechanical Effect of Ferromagnetic Steel**
Bin YANG, Hongmei LI, Ankang ZANG, Kaimin ZHONG
School of Mechanical Engineering, Beifang University of Nationalities
- Poster-4** **Study on Material Properties of Concrete Structures Exposed to Extremely High Temperature due to Severe Accident**
Yuma SATO, Thi-Mai-Dung DO, Masahide SUZUKI
Nagaoka University of Technology
- Poster-5** **Analysis and Correction of Measure Error Due to the ECT Probe Calibration (35)**
Dongli ZHANG¹, Meixian WU¹, Zhenmao CHEN², Yong LI²
1 School of Mechanical Engineering, Beifang University of Nationalities;
2 State Key Laboratory for Strength and Vibration of Mechanical Structures, Xi'an Jiaotong University
- Poster-6** **Quantitative Evaluation of Stress Corrosion Cracking Based on Features of Eddy Current Testing Signals**
Li WANG¹, Zhenmao CHEN²
1 College of Science, Xi'an University of Posts and Telecommunications;
2 State Key Laboratory for Strength and Vibration of Mechanical Structures, Xi'an Jiaotong University
- Poster-7** **Detectability of Eddy Current Testing for Fiber Orientation of Cross-ply CFRP with Differential Type Probe**
Yuki YOSHIKAWA¹, Hiroyuki KOSUKEGAWA², Ryoichi URAYAMA,
Tetsuya UCHIMOTO², Toshiyuki TAKAGI²
1 Graduate School of Engineering, Tohoku University;
2 Institute of Fluid Science, Tohoku University
- Poster-8** **Damage and Hydrogen Retention in Lithium-based Ceramics**
Ming ZHAO¹, Daming ZHUANG¹, Shinji NAGATA², Tatsuo SHIKAMA²
1 School of Materials Science and Engineering, Tsinghua University;
2 Institute for Materials Research, Tohoku University
- Poster-9** **Investigation on Stress Corrosion Cracking of PWR Steam Generator**

Tubing Materials

Shuangqun ZHAO, Yanfeng WANG

Shanghai Power Equipment Research Institute

Poster-10 Enhancement Photocatalysis Properties of Degrading Methyl Orange by Different Morphology of ZnO in Different Substrates

Yimeng FENG, Zhengcao LI

Key Laboratory of Advanced Materials, School of Materials Science and Engineering, Tsinghua University

Poster-11 Investigation on the Feasibility of Artificial Imitative Crack Fabricated by Diffusion Bonding to Simulate the Real Stress Corrosion Crack

Wenlu CAI, Cherdpong JOMDECHA, Shejuan XIE, Cuixiang PEI, Yong LI, Zhenmao CHEN

State Key Laboratory for Strength and Vibration of Mechanical Structures, Xi'an Jiaotong University

Poster-12 Research on Numerical Method for Non-Contacting ACFM of Buried Pipes in Nuclear Power Plants

Xudong LI, Hongwei YUAN, Shejuan XIE, Cuixiang PEI, Zhenmao CHEN

State Key Laboratory for Strength and Vibration of Mechanical Structures, Xi'an Jiaotong University

Poster-13 Primary Irradiation Damage near the Ferrite/Y₂Ti₂O₇ Nanocluster Interface in Nanostructured Ferritic Alloys by Molecular Dynamics Simulations

Yiqiang SUN

School of Materials Science and Engineering, Tsinghua University

Poster-14 Investigation and Analysis for Stains Appeared on Boron Stainless Steel A887 304B7

Zhi YANG, Yu-dong DENG

Regional Manufacturing Quality Surveillance Engineer, European China Nuclear Power Engineering Company, Ltd. (CNPEC)

Poster-15 Root Cause Analysis and Countermeasure of Austenitic Stainless Pipe Leakage in Nuclear Power Plant

Mu QIAO

Regional Manufacturing Quality Surveillance Engineer, European China Nuclear Power Engineering Company, Ltd. (CNPEC)

Poster-16 Simulation of a Nuclear Power Plant Primary System Thermal-hydraulic Model under the Conditions of Power Switch and Power Failure

Hongyan WU

Wuhan University

Poster-17 The Influence of Xe⁺ Irradiation on the Heat-affected-zone of Zr-4 Cladding

Jingjing LIAO, Zhengcao LI

Key Laboratory of Advanced Materials of Ministry of Education, School of Materials Science and Engineering, Tsinghua University

Poster-18 Research on Reaction Kinetics of Pt-Pd Catalysts Supported on Porous

Stainless Steel Plate

Zhijiang CHEN, Ting JIANG, Bo GAO

Institute of Material, China Academy of Engineering Physics

Poster-19

**Supported Pd Nanoclusters for the Hydrogen Mitigation Application
in Severe Accidents**

Bo GAO, Zhengfeng SHAO, Hongzhi ZHU, Zhi ZHANG, Xinchun LAI

Institute of materials, China Academy of Engineering Physic

Poster-20

Radiation Dose Calculation of Stator Winding in Wet Stator Motor Pump

Eing Yee YEOH, Linsen LI, Ziguan WANG, Feng SHEN

State Power Investment Corporation Research Institute