

FINAL PROGRAMME



# 28th

## IFHTSE2023

November 13th to 16th, 2023.  
PACIFICO YOKOHAMA

Congress in Yokohama

第28回熱処理国際会議

2023年

11月13日[月]—16日[木] パシフィコ横浜

Organized by

The Japan Society for Heat Treatment (JSHT)

The International Federation for Heat Treatment and Surface Engineering (IFHTSE)



## Welcome Message

Welcome to Yokohama. It is my pleasure to host the 28th IFHTSE Congress in Yokohama. This congress was originally scheduled to be held in the fall of 2021 but has been postponed for two years due to the impact of COVID-19. There will be 99 oral presentations and 67 poster presentations. The number of participants is expected to exceed 350.

The 28th IFHTSE Congress in Yokohama is the first IFHTSE congress in Japan since the 17th IFHTSE Congress in Kobe in 2008 and the first international conference on heat treatment since the QDE in Nagoya in 2018. Although COVID-19 is not completely over, we are grateful to the many people who attend the 28th IFHTSE Congress 2023.



As a new initiative, we have planned a "Heat Treatment and Surface Engineering Summit" on November 15th at 3:30 p.m. We would like to show the way forward for heat treatment by inviting many people to discuss the initiatives of each region in the field of heat treatment, environmental and energy issues, heat treatment's approach to the SDGs, and the future of heat treatment.

I hope that there will be lively discussions during the presentations, that new friends will be made at the reception, and that many people will have memories that will make them want to visit Yokohama again.

We would like to thank the Japan Metal Heat Treatment Association, many companies, and the Tokyo Ohka Foundation for The Promotion of Science and Technology for their generous donations to make this Congress possible. The Japan National Tourism Organization and PACIFICO Yokohama provided support in organizing the congress. We also would like to express my gratitude to them.

Professor Dr. Masahiro Okumiya  
Chairperson of 28th IFHTSE Congress in Yokohama  
President of Japan Society for Heat Treatment and  
The International Federation for Heat Treatment and Surface Engineering

# Organization

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## CHAIRPERSON

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**Massimo Pellizzari**, University of Trento, Italy

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**Isao Nakamura**, Tokyo Metropolitan Industrial Technology Research Institute

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**Kaneharu Okuda**, JFE Steel Corporation

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**Kazuhiro Kawasaki**, The Japan Society for Heat Treatment

**Michiharu Narazaki**, Tochigi Prefectural University of Health and Welfare

# Floor Plan

## PACIFICO YOKOHAMA Conference Center 3rd Floor



**Congress Banquet** on Nov. 15th :  
 InterContinental Yokohama Grand 3<sup>rd</sup> Floor  
 5 minutes walk from Conference Center through 2F corridor



# Plenary Lectures

PL  
01

**Prof. Lu Jian**

City University of Hong Kong, China



November 14 (Tue.) 10:05-10:55 Room 301+302

**Recent Development of Surface Modification: from Nanostructure to Supra-Nanostructure**

PL  
02

**Prof.  
Marcel A.J. Somers**

Technical University of Denmark,  
Department of Civil and Mechanical  
Engineering, Denmark



November 14 (Tue.) 10:55-11:45 Room 301+302

**Nitriding and Nitrocarburizing; an Interwoven Braid of Science and Innovation**

# Keynote Lectures

KL  
01

**Prof. Imre Felde**

Obuda University, Hungary

November 14 (Tue.) 12:45-13:25 Room 301+302

**Biomimetic Methods and AI Technics Assisting Heat Treatment Processes Nitriding and Nitrocarburizing; an Interwoven Braid of Science and Innovation**



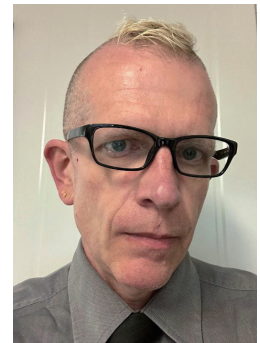
KL  
02

**Dr. Roger Lumley**

A. W. Bell Pty Ltd., Australia

November 14 (Tue.) 14:00-14:40 Room 315

**A Study on the Homogeneity of Plastic Deformation and its Importance to Tensile Ductility in Al-Si-Cu-Mg (C355) Investment Castings**



KL  
03

**Prof. Massimo Pellizzari**

University of Trento, Italy

November 14 (Tue.) 15:05-15:45 Room 301+302

**Heat Treatment for Additive Manufacturing**





KL  
04

**Prof.**  
**Toshihiro Tsuchiyama**

Kyushu University, Japan

November 15 (Wed.) 8:45-9:25 Room 304

Microstructure Control of a Medium Manganese Steel  
by Combined Interrupted Quenching and Intercritical  
Annealing



KL  
05

**Prof.**  
**Rainer Fechte-Heinen**

Leibniz-Institut für Werkstofforientierte  
Technologien - IWT, Germany

November 14 (Tue.) 16:20-17:00 Room 304

Quenching and Distortion



KL  
06

**Prof. Koji Takahashi**

Yokohama National University, Japan

November 15 (Wed.) 9:35-10:15 Room 311+312

Effects of Laser Peening on the Very High Cycle  
Fatigue Strength of Additively Manufactured Maraging  
Steel



# Heat Treatment & Surface Engineering Summit

熱処理サミット

November 15 (Wed.) 15:30-17:30 Room 301+302

With English / Japanese simultaneous translation (日英同時通訳あり)

**Chairperson:**

**Prof. Masahiro Okumiya**

Toyota Technological Institute, JSHT and IFHTSE

① **Trends in the US Heat Treatment Industry**

アメリカの熱処理事情

**Janusz Kowalewski**

Ipsen International, USA

② **Heat Treatment Situation in Europe**

ヨーロッパの熱処理事情

**Prof. Rainer Fechte-Heinen**

Leibniz-Institut für Werkstofforientierte Technologien - IWT, Germany

③ **Heat treatment market in Asia**

アジア地域における熱処理市場について

**Seiji Kaga (加賀 誠士)**

Dowa Thermotech Co., Ltd. (DOWAサーモテック株式会社)

④-1. **Trends in Japan's Metal Heat Treatment Industry**

日本の金属熱処理業界動向

**Toshiki Hara (原 敏城)**

Japan Metal Heat Treatment Industry Association, Vice Chairman

(日本金属熱処理工業会 副会長)

METAL HEAT Co., Ltd., Representative Director

(株式会社メタルヒート 代表取締役)

④-2. **Recent Trend of Research and Development on Heat Treatment Technology in Japan**

日本の熱処理技術の最近の研究開発動向

**Dr. Yoichi Watanabe (渡邊 陽一)**

Japan Society for Heat Treatment, Vice President

(日本熱処理技術協会 副会長)

NIHON PARKERIZING CO., LTD., Fellow

(日本パーカライズング株式会社 フェロー)

⑤ **Question & Answer, Discussion**



## Congress Information

### Venue

PACIFICO Yokohama Conference Center 3<sup>rd</sup> floor; 1-1-1  
Minato Mirai, Nishi-ku, Yokohama 220-0012, Japan  
Phone: +81-45-221-2155,  
<https://www.pacifico.co.jp/>

### Registration & Information Desk

Place: Landside Foyer on the 3<sup>rd</sup> floor  
Open hours: Nov. 13<sup>th</sup> 16:00-18:30  
Nov. 14<sup>th</sup> 8:00-17:30  
Nov. 15<sup>th</sup> 8:00-17:30  
Nov. 16<sup>th</sup> 8:00-13:00

### Preview PC

Near the Registration Desk or  
Each Conference Room (=Uploading PC)

### Exhibition & Coffee break Service

Place: Room 303 and Seaside Foyer  
Open hours: Nov. 14<sup>th</sup> 9:00-17:00  
Nov. 15<sup>th</sup> 9:00-17:00  
Nov. 16<sup>th</sup> 9:00-11:00

### Exhibition Introduction with Lunch Box

Place: Room 301+302  
Date and Time: Nov. 14<sup>th</sup> 12:00-12:20  
Nov. 15<sup>th</sup> 12:40-13:00

### Message Board

A message board will be located near the Registration Desk. Please check the message board regularly for any changes of programs and personal messages.

### Simultaneous Interpretation

Simultaneous Interpretation service between English and Japanese is available for the "Heat Treatment and Surface Engineering Summit". Receivers will be provided

at the Registration and Information desk during Nov. 15<sup>th</sup> 14:30-15:30 in exchange for two business cards as a deposit.

### Internet Access

Wireless network connections are available in the Conference Center.  
SSID: FREE-PACIFICO; No password

### Business Center

Self-service printer is located on the 1<sup>st</sup> floor of the Conference Center. Documents in USB memory can be printed.

### Refreshments

Refreshments will be served during breaks between the sessions. Coin vending machine is available at the end of the seaside foyer.

### Lunch Box

Lunch box is provided at the lunch time at landside and seaside foyer on 14<sup>th</sup>, 15<sup>th</sup>, and 16<sup>th</sup>.

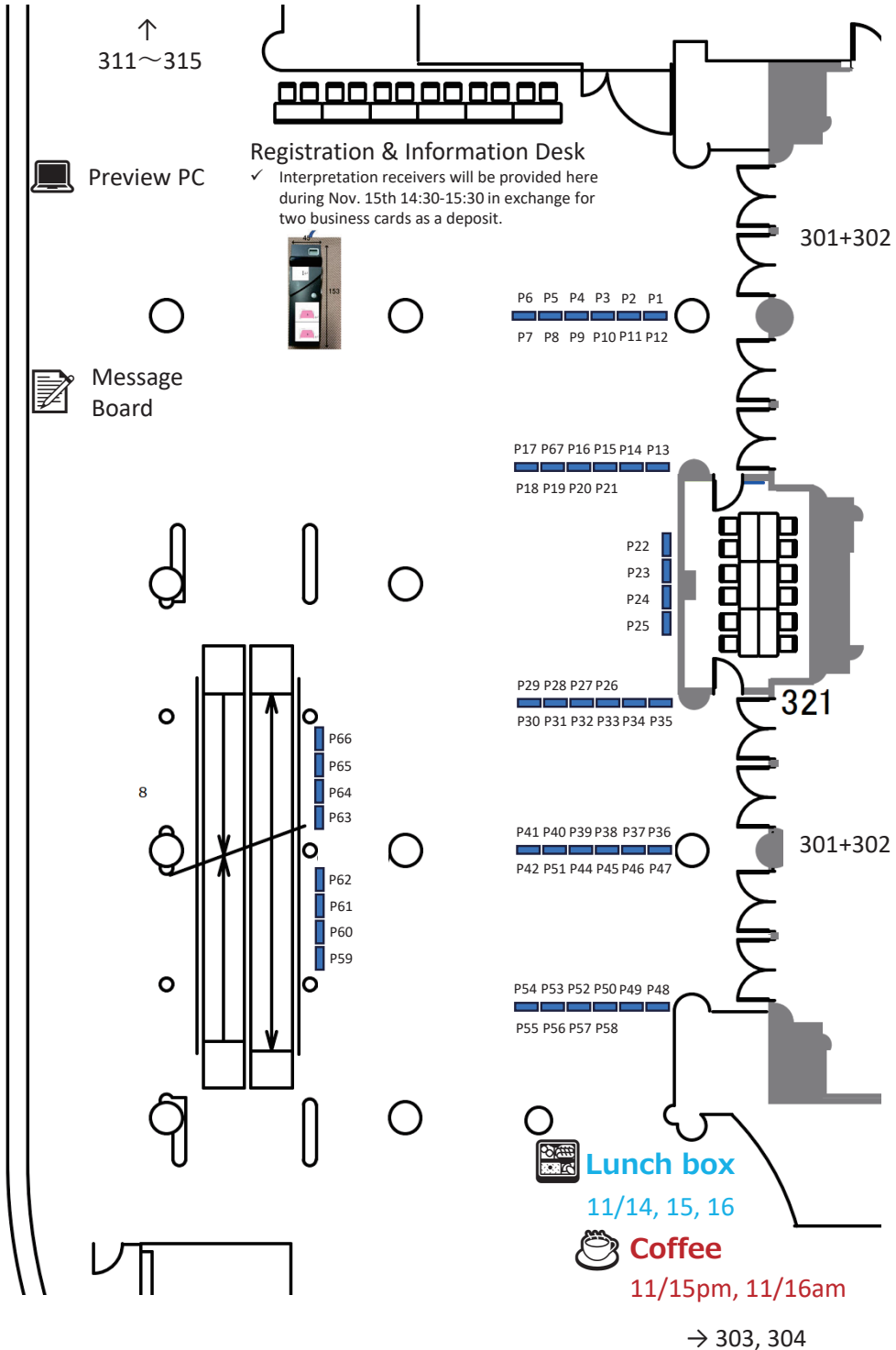
### General Support & Assistance

Japan Visitor Hotline  
<https://www.japan.travel/en/plan/hotline/>

### Acknowledgements

28<sup>th</sup> IFHTSE Congress is strongly supported by many benefactions from companies, institutions, and individuals through JNTO. The Tokyo Ohka Foundation for The Promotion of Science and Technology and several companies donated directly to the Congress organization committee. The list of benefactors will be shown in Congress report to JNTO and "Netsu Shori" which is a journal of The Japan Society for Heat Treatment.

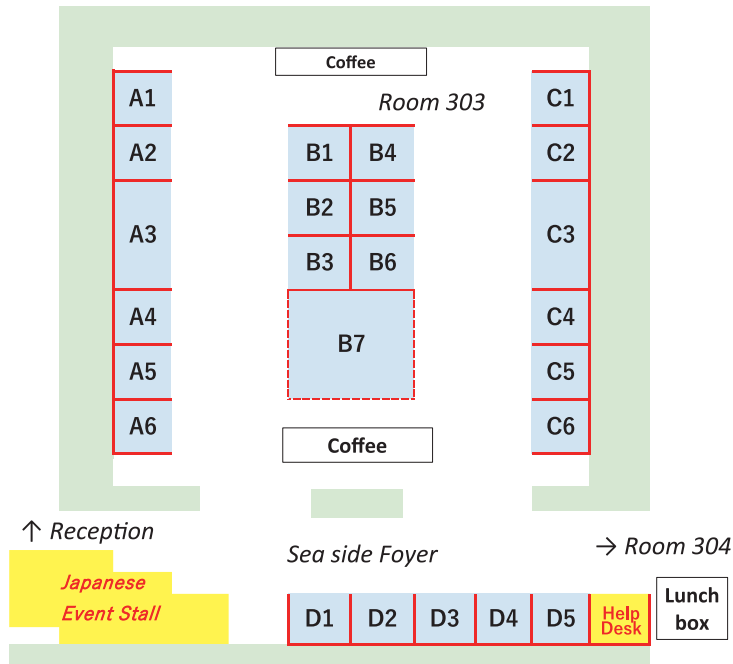
# Poster Layout (Landside Foyer)





# Exhibition Map

from Nov. 14<sup>th</sup> am to Nov. 16<sup>th</sup> am



- A1 Air Liquide Japan G.K.
- A2 Daido Bunseki Research INC.
- A3 CHUGAI RO CO., LTD.
- A4 Matsuzawa Co., Ltd.
- A5 NDK Inc.
- A6 NAKANIHON-RO KOGYO CO., LTD.

- B1 IMT Co., Ltd.
- B2 HEF DURFERRIT JAPAN Co., Ltd.
- B3 Pulstec Industrial Co., Ltd.
- B4 DOWA THERMOTECH CO., LTD.
- B5 Mikuni Kiko Co., Ltd.
- B6 IHI Machinery and Furnace Co., Ltd.
- B7 Nippon Grease Co., Ltd.

- C1 IPSEN USA
- C2 JFE Techno-Research Corporation
- C3 Fuji Electronics Industry Co., Ltd.
- C4 Osaka Yakin Kogyo Co., Ltd.
- C5 Neturen Co., Ltd.
- C6 JTEKT THERMO SYSTEMS CORPORATION

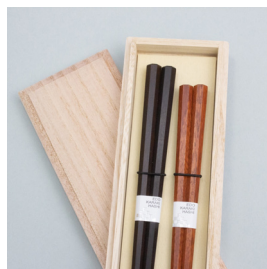
- D1 YAMAMOTO SCIENTIFIC TOOL LABORATORY CO., LTD.
- D2 SINTOKOGIO, LTD.
- D3 Sankoh Material Co. Ltd.
- D4 Idemitsu Kosan Co., Ltd.
- D5 TOYO CORPORATION

## Japanese Event Stall

from Nov. 14<sup>th</sup> am to Nov. 15<sup>th</sup> pm



Hamacho takatora  
(Traditional Colored Textile)



Kawakami-Shoten  
(Edo-Kara-Ki-Bashi Chopsticks)



MARUGO Company Inc.  
(Tabi-Shoes)

# Official & Social Programs

## Welcome Party with JSHT 60<sup>th</sup> Anniversary Awarding Ceremony

**Date & Time:** Nov. 13<sup>th</sup> 17:00-19:00

**Place:** Conference Center 3F room 315

Special cocktail menu and beverages will be served.

JSHT 60<sup>th</sup> Anniversary Awarding Ceremony

- ✓ Congratulatory Message from IFHTSE
- ✓ 60<sup>th</sup> Anniversary JSHT Slide show
- ✓ Special Achievement Awarding Ceremony of JSHT
  - Prof. Koji Shibata
  - Prof. Tadashi Maki
  - Prof. Takashi Matsuo
  - Prof. Yoshinao Mishima
  - Prof. Setsuo Takaki
- ✓ Music performance by “String Quartet Arco”
  - A. Vivaldi, The Four Seasons, “Spring”
  - G. F. Handel, “Hallelujah”
  - J. S. Bach, “Jesu, Joy of Man’s Desiring”
  - K. Yamada, “Aka-Tombo (Red Dragonflies)”
  - W. A. Mozart, “Ave Verum Corps”
  - (Encore)



“String Quartet Arco”

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## Opening & Awarding Ceremony

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**Date & Time:** Nov. 14<sup>th</sup> 8:45-9:45

**Place:** Conference Center 3F room 301+302

✓ Awarding Ceremony

Medal: Prof. Dr. Michel Jeandin

Fellow ship: Prof. Dr. Yoshinao Mishima

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## Exhibition Introduction with Lunch Box

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**Date & Time:** Nov. 14<sup>th</sup> 12:00-12:20

Nov. 15<sup>th</sup> 12:40-13:00

**Place:** Room 301+302

✓ Please attend after pick up your preferred lunch box at landside or seaside foyer.

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## Poster Presentation & Discussion

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**Date & Time:** Nov. 15<sup>th</sup> 13:30-15:00

**Place:** Landside Foyer

✓ Best poster award ceremony will be held during the Congress Banquet.

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## Heat Treatment & Surface Engineering Summit

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**Date & Time:** Nov. 15<sup>th</sup> 15:30-17:30

**Place:** Room 301+302

✓ Simultaneous Interpretation service between English and Japanese is available.

Receivers will be provided at the Registration and Information desk during Nov. 15<sup>th</sup> 14:30-15:30 in exchange for two business cards as a deposit.

## Congress Banquet with Best Poster Award Ceremony

**Date & Time:** Nov. 15<sup>th</sup> 18:30-20:30

**Place:** InterContinental Yokohama Grand 3<sup>rd</sup> Floor

Five minutes' walk from Conference Center through 2F corridor

- ✓ Special French cuisine and beverages will be served at the round table.
- ✓ 18:10- Welcome Music performance by “String Quartet Arco”  
W. A. Mozart, “Eine Kleine Nachtmusik”  
L. v. Beethoven, “An die Freude”  
J. Strauss, “Radetzky Marsch” ... Please clap your hands.
- ✓ 18:30- Opening remarks, speeches, and toast
- ✓ 18:45- Japanese traditional song & dance performance by “Yokohama-Geigi-Association”  
Ex.「Hama-Jiman」, 「Kappore」, 「Yakkosan」
- ✓ Special collaboration performance of “Yokohama-Geigi-Association” and “String Quartet Arco”  
「Nogeyama-Bushi」
- ✓ Free time
- ✓ 19:30- “Yokohama-Geigi-Association” second stage  
Ex.「Seven Lucky Gods」, 「Shi-Shi-Mai」, 「Dai-Koku-Mai」, 「Tora-Tora」
- ✓ Best Poster Award Ceremony which is sponsored by the Japan Metal Heat Treatment Association



Hikari Tasaki  
(MC)



“Yokohama-Geigi-Association”



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## Tom Bell Young Author Award & Closing Ceremony

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**Date & Time:** Nov. 16<sup>th</sup> 11:55-12:30

**Place:** Room 301+302

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## Optional Tours

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### Organized by JTB Yokohama Branch

**Date:** Nov. 17<sup>th</sup>

Departed from InterContinental Yokohama Grand 1<sup>st</sup> Floor Entrance

- ✓ Factory Tour A: Isuzu Motor Fujisawa Plant via Tsurugaoka Hachimangu  
Departing Time: 9:00
- ✓ Factory Tour B: JFE Steel Eastern Japan Chiba via Umi-Hotaru  
Departing Time: 8:45
- ✓ Excursion: Kamakura One Day Tour  
Departing Time: 9:00

**Application Web Site:** <https://amarys-jtb.jp/ifhtse2023/>

- ✓ Please come to the meeting point by 15minutes before each departing time.

☆ All oral presentations include five minutes discussion except Heat Treatment & Surface Engineering Summit.

Program

# Oral Presentations

**Room 301+302**

**November 14 - Tue**

**8:45 Opening Ceremony & Awards Ceremony**

Opening Declaration      President of IFHTSE Dr. Masahiro Okumiya

Awards Ceremony

Medal:                      Professor Dr. Michel Jeandin  
                                    Laudation by Mr. Christophe Stocky

Fellowship:                Professor Dr. Yoshinao Mishima  
                                    Laudation by Dr. Masahiro Okumiya

**9:45 Break**

**10:05-11:45 Plenary Lectures**

Chairpersons:            Masahiro Okumiya (*Toyota Technological Institute, Japan*)  
                                    Imre Felde (*Obuda University, Hungary*)

**10:05 PL01 Recent Development of Surface Modification: from Nanostructure to Supra-Nanostructure**

Prof. Lu Jian, *City University of Hong Kong*

**10:55 PL02 Nitriding and Nitrocarburizing; an Interwoven Braid of Science and Innovation**

Prof. Marcel Somers, *Technical University of Denmark*

**11:45 Exhibition Introduction and Lunch**

Room 301+302

November 14 - Tue

## Modelling and Simulation of Thermal Processes and Surface Engineering I

### 12:45-13:25 Keynote Lecture 1

Chairpersons: Rainer Fechte-Heinen (*Leibniz-Institut für Werkstofforientierte Technologien - IWT, Germany*)  
Goro Miyamoto (*Tohoku University, Japan*)

12:45 **KL01** Biomimetic Methods and AI Technics Assisting Heat Treatment Processes  
Nitriding and Nitrocarburizing; an Interwoven Braid of Science and Innovation  
Prof. Imre Felde, *Obuda University, Hungary*

13:25 **MS01** Modeling of Variation on Oil Quenching with Iterative Quenching Using Cellular Automaton  
Tsuyoshi Sugimoto, *National Institute of Technology, Asahikawa College*

13:50 **MS02** Modelling and Validation of Precipitate Formation during Heat Treatment in 50CrMo4 Steel  
Abigail Austin, Dr. Hermann Autenrieth, Dr. Stefan Dietrich, Prof. Dr. rer. nat. habil. Astrid Pundt, Prof. Dr.-Ing. habil. Volker Schulze  
*Robert Bosch GmbH; Robert Bosch GmbH; Institute of Applied Materials – WK, Karlsruhe Institute of Technology; Institute of Applied Materials – WK, Karlsruhe Institute of Technology; Institute of Applied Materials – WK, Karlsruhe Institute of Technology*

14:15 **MS03** Concurrent Improvement of Strength, Formability and SCC Resistance of Al-Zn-Mg-Cu Alloy by Hot Stamping after Rapid Heating and Re-aging on Paint Baking Treatment  
Shoichi Hirose<sup>1</sup>, Junmo Kim<sup>1</sup>, Tomoyoshi Maeno<sup>1</sup>, Yasushi Suzuki<sup>2</sup>, Yuuji Yabuki<sup>2</sup>  
<sup>1</sup> *Yokohama National University*, <sup>2</sup> *G-tekt Corporation*

14:40 Break

## Room 301+302

November 14 - Tue

### Thermal and Thermochemical Treatment in Additive Manufacturing

**15:05-15:45 Keynote Lecture 3**

Chairpersons: Lorena Emanuelli (*University of Trento, Italy*)  
Kouji Tanaka (*Daido University, Japan*)

**15:05 KL03 Heat Treatment for Additive Manufacturing**

Prof. Massimo Pellizzari, *University of Trento, Italy*

**15:45 AM01 Improving Additive Manufactured Parts with Aluminum Ion Vapor Deposition**

Janusz Kowalewski, *Ipsen International*

**16:10 AM02 Tailored Hardness Profiles Through a Combination of Specialized PBF-LB Processing Strategies with Subsequent Heat Treatment for Graded High-strength Components Made of Maraging Steel**

Niki Nouri<sup>1</sup>, Gregor Graf<sup>2</sup>, Stefan Dietrich<sup>1</sup>, Volker Schulze<sup>1</sup>

<sup>1</sup> *Institute for Applied Materials – Materials Science and Engineering (IAM-WK) / Karlsruhe Institute of Technology (KIT)*, <sup>2</sup> *Rosswag GmbH*

**16:35 AM03 Effect of Heat Treatment on Corrosion Property of Laser Additive Manufactured Stainless Steel**

Kenji Doi<sup>1</sup>, Shigehiro Matsuda<sup>1</sup>, Naoya Aoe<sup>2</sup>, Noriyuki Nishi<sup>1</sup>,  
Akio Nishimoto<sup>2</sup>, Shuntaro Terauchi<sup>1</sup>

<sup>1</sup> *Osaka Yakin Kogyo Co., Ltd.*, <sup>2</sup> *Kansai University*



## Thermal Processing of Iron and Steels :I

Chairpersons: Christophe Stocky (*ABS Centre Metallurgique, France*)  
Toshihiro Tsuchiyama (*Kyushu University, Japan*)

**12:45 TP01 Microstructural Size Effect on Strain-Hardening of As-quenched Low Alloyed Martensitic Steels**

Manabu Takahashi<sup>1</sup>, Kenta Sakaguchi<sup>2</sup>, Hiroyuki Kawata<sup>3</sup>,  
Kohtaro Hayashi<sup>3</sup>, and Shigeto Yamasaki<sup>1</sup>

<sup>1</sup> *Kyushu University*, <sup>2</sup> *JX Nippon Mining & Metals*, <sup>3</sup> *Nippon Steel Corporation*

**13:10 TP02 Microstructure Evolution During Directed-Energy Deposition of X40CrMoV5-1 Analyzed by In-situ Synchrotron X-ray Diffraction and Atom Probe Tomography**

Antonio Carlos de Figueiredo Silveira<sup>1</sup>, Lisa T. Belkacemi<sup>1,2</sup>,  
Pedro José de Castro<sup>1</sup>, Jérémy Epp<sup>1,2</sup>, Rainer Fechte-Heinen<sup>1,2</sup>

<sup>1</sup> *Leibniz-Institut für Werkstofforientierte Technologien-IWT*, <sup>2</sup> *MAPEX Center for Materials and Processes, Universität Bremen*

**13:35 TP03 High Precision FE-EPMA for Carbon Distribution Mapping during Ferrite Transformation in Low Carbon Mn-Si Steels**

Kaneharu Okuda, Takako Yamashita, Tatsuya Nakagaito

*JFE Steel corporation, Steel research laboratory*

**14:00 TP04 Hydrogen-induced Delayed Fracture Properties for Ultra-high Strength Low-alloy Steels Processed by Thermomechanical Treatments; Ausforming vs Warm Tempforming**

Yuuji Kimura, Taku Moronaga, Tadanobu Inoue

*National Institute for Materials Science*

**14:25 TP05 Quantitative Evaluation of the Effect of Cooling Rate on Auto-tempering**

Osamu Idohara<sup>1</sup>, Yohei Hiyama<sup>1</sup>, Yoshitaka Misaka<sup>1</sup>, Setsuo Takaki<sup>2</sup>,  
Toshihiro Tsuchiyama<sup>3</sup>

<sup>1</sup> *Neturen Co., Ltd*, <sup>2</sup> *Emeritus professor, Kyusyu University*,

<sup>3</sup> *Department of Materials, Kyusyu University*

**14:50 Break**

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## Residual Stresses and Distortion

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Chairpersons: Lesley Frame (*University of Arizona, USA*)  
Yuji Kimura (*National Institute for Materials Science, Japan*)

**15:05 RS01 Quenching Induced Residue Stress in 8Cr4Mo4V Steel Ring: A FEM simulation**  
Rui Wang, Hao Jiang, Jian-Tang Jiang, Ding-Ge Fan, Wen-Zhu Shao, Liang Zhen  
*Harbin Institute of Technology*

**15:30 RS02 The effect of Ion Nitriding on the Residual Stress of the Nitrided Layer on Austenitic Stainless.**  
Yi-Tsung Hsiang, Chung-Chun Wu  
*Southern Taiwan University of Science and Technology*

**15:55 RS03 Effect of Shot Peening on Micro Pitting Fatigue of Bearing Steel**  
Naoya Kamura<sup>1</sup>, Takumi Fujita<sup>1</sup>, Toshihiko Sasaki<sup>2</sup>  
<sup>1</sup> NTN corporation, <sup>2</sup> Kanazawa University

**16:20-17:00 Keynote Lecture 5**  
Chairpersons: Yuji Kimura (*National Institute for Materials Science, Japan*)  
Lesley Frame (*University of Arizona, USA*)

**16:20 KL05 Quenching and Distortion**  
Prof. Rainer Fechte-Heinen,  
*Leibniz-Institut für Werkstofforientierte Technologien - IWT*

Room 315

November 14 - Tue

## Thermal Processing of Non-Ferrous Alloys : I

Chairpersons: Shoichi Hirose (Yokohama National University, Japan)  
Ing-Song Yu (National Dong Hwa University, Taiwan)

**12:45 TN01 Optimization of the Controlled Cooling Condition in Batch-Type Furnace for the Recycled Al-Mg-Si Based Alloy Sheets**

Heon Kang<sup>1</sup>, Sang Gweon Kim<sup>1</sup>, Kuk Hyun Yeo<sup>1</sup>, Dae Young Kim<sup>1</sup>, Young Ok Yoon<sup>1</sup>,  
Jae Hyuck Shin<sup>2</sup>, Young Kil Jung<sup>2</sup>, SE Hoon Kim<sup>2</sup>, Jin Pyeong Kim<sup>2</sup>

<sup>1</sup> Korea Institute of Industrial Technology,

<sup>2</sup> Korea Automotive Technology Institute

**13:10 TN02 Effect of Magnetic Fields by Helmholtz Coils on the Investment Casting A356 Al-Si Alloy with Grain Refiner Al-5Ti-B**

Muhamad Jalu Purnomo, Ya-Chu Tsai, Yu-Xin Hsu, Ing-Song Yu

Department of Materials Science and Engineering, National Dong Hwa University,  
Hualien, Taiwan

**13:35 TN03 On Precipitation Hardening Heat Treatment of a Low Li-content 5083 Al-Mg-Mn Alloy**

Jun-Yen Uan<sup>1</sup>, Yuan-Yung Hsieh<sup>1</sup>, Jun-Kai Lin<sup>2</sup>

<sup>1</sup> Department of Materials Science and Engineering, National Chung Hsing University,

<sup>2</sup> Aml Materials Technology

**14:00-14:40 Keynote Lecture 2**

Chairpersons: Ing-Song Yu (National Dong Hwa University, Taiwan)  
Shoichi Hirose (Yokohama National University, Japan)

**14:00 KL02 A Study on the Homogeneity of Plastic Deformation and its Importance to Tensile Ductility in Al-Si-Cu-Mg (C355) Investment Castings**

Dr. Roger Lumley, A. W. Bell Pty Ltd., Australia

**14:40 Break**

**Thermal Processing of Non-Ferrous Alloys : II**

Chairpersons: Roger Lumley (*A. W. Bell Pty. Ltd, Australia*)  
Satoshi Emura (*National Institute for Materials Science, Japan*)

**15:05 TN04 Microstructure and Mechanical Behavior of STA Heat-treated Ti-6Al-4V Alloy for Aerospace Component**

Seongji Seo<sup>1,2</sup>, Yanghoo Kim<sup>1</sup>, Geeyoung Lee<sup>3</sup>, Hojoon Choi<sup>1</sup>,  
Jeongho Han<sup>2</sup>, Jiyong Park<sup>1</sup>  
<sup>1</sup> *Korea Institute of Industrial Technology*, <sup>2</sup> *Hanyang University*,  
<sup>3</sup> *KPC Metal Co., Ltd.*

**15:30 TN05 Improvement of Formability of Silicon-containing Recycled Wrought Aluminium by Hot Stamping after Rapid Heating**

Ryohei Kawana<sup>1</sup>, Shoichi Hirose<sup>1</sup>, Mitsuhiro Ootaki<sup>1</sup>, Tomoyoshi Maeno<sup>1</sup>,  
Yasushi Suzuki<sup>2</sup>, Yuuji Yabuki<sup>2</sup>  
<sup>1</sup> *Yokohama National University*, <sup>2</sup> *G-tekt Corporation*

**15:55 TN06 Effect of Deep Cryogenic Treatment on Aging Behavior and Properties of Al-Mg-Si Alloy**

B. Podgornik<sup>1</sup>, M. Jovičević-Klug<sup>1,2</sup>, P. Jovičević-Klug<sup>1,2</sup>  
<sup>1</sup> *Institute of Metals and Technology*, <sup>2</sup> *Max-Planck-Institut für Eisenforschung*

**16:20 TN07 Texture Control of TiAl Based Alloys by Uniaxial Compressive Deformation at High Temperature**

Shohei Harada, T. Yamaguchi, P. Thirathipviwat, M. Hasegawa  
*Yokohama National University*

**16:45 TN08 Texture Development of Ti-Zr-Nb Alloy under High-temperature Deformation**

Makoto Hasegawa<sup>1</sup>, Pramote Thirathipviwat<sup>1</sup>, Equo Kobayashi<sup>2</sup>,  
Osamu Umezawa<sup>1</sup>, Hiroshi Fukutomi<sup>1,3</sup>  
<sup>1</sup> *Yokohama National University*, <sup>2</sup> *Tokyo Institute of Technology*, <sup>3</sup> *Osaka University*



## Metallurgy and Properties of Heat Treated and/or Deformed Steels and Non-Ferrous Alloys

Chairpersons: Andreas Rosenauer (*University of Leoben, Austria*)  
Yoshimasa Funakawa (*JFE Techno-Research Corp., Japan*)

- 12:45 MP01 Effects of Thermomechanical Processing on the Microstructural Development of Continuously Cooled Carbide-free Bainitic Steels**  
de Castro, Pedro José., Epp, Jeremy.  
*Leibniz Institute for Materials Engineering-IWT and MAPEX Centre for Materials and Processes*
- 13:10 MP02 A Study on Microstructural Change of 1% C-doped CoCrFeNi High Entropy Alloy during Isochronal Annealing**  
Pramote Thirathipiwat<sup>1</sup>, Yusuke Onuki<sup>2</sup>, Makoto Hasegawa<sup>1</sup>, Shigeo Sato<sup>3</sup>  
<sup>1</sup> *Yokohama National University*, <sup>2</sup> *Tokyo Denki University*, <sup>3</sup> *Ibaraki University*
- 13:35 MP03 High-Temperature Hardness in Steels with Various Carbon Concentrations and Microstructures Measured by Small Ball Rebound Hardness Test**  
Norimitsu Koga<sup>1</sup>, Kouki Koizumi<sup>2</sup>, Shuto Takayasu<sup>2</sup>, Osamu Umezawa<sup>2,3</sup>, Mizuki Watanabe<sup>4</sup>, Masayuki Yamamoto<sup>4</sup>, Takashi Yamamoto<sup>4</sup>  
<sup>1</sup> *Kanazawa University*, <sup>2</sup> *Yokohama National University*, <sup>3</sup> *Vysoká Škola Báňská - Technical University of Ostrava*, <sup>4</sup> *Yamamoto Scientific Tool Laboratory Co., Ltd.*
- 14:00 MP04 Effect of Heat Treatment on Dry-sliding Wear and Corrosion Behavior of High Chromium Cast Irons**  
Kittikhun Ruangchai<sup>1</sup>, Ruangdaj Tongsri<sup>2</sup>, John T.H. Pearce<sup>3</sup>,  
Torrarin Chairuangstri<sup>2</sup>, Amporn Wiengmoon<sup>1</sup>  
<sup>1</sup> *Naresuan University*, <sup>2</sup> *Thailand National Metal and Materials Technology Center*,  
<sup>3</sup> *Chiang Mai University*
- 14:25 MP05 Research on the Martensitic Transformation Induced by Cryogenic Treatment in Stainless Steel**  
Kaixuan Gu, Zeju Weng, Chen Cui, Mingli Zhang, Jia Guo, Junjie Wang  
*Technical Institute of Physics and Chemistry, CAS*
- 14:50 Break**

## Surface Hardening

Chairpersons: Stefan Dietrich (*Institute for Applied Materials – Werkstoffkunde, KIT, Germany*)  
Yoichi Watanabe (*Nihon Parkerizing Co. Ltd., Japan*)

- 15:05 SH01 Strengthening Mechanism by Ti-N Clusters and Nano-sized TiN Precipitate Formed during Nitriding of Fe-Ti Alloy**  
Goro Miyamoto<sup>1</sup>, Kyoka Itasaka<sup>2</sup>, Tadashi Furuhashi<sup>1</sup>  
<sup>1</sup> *Institute for Materials Research, Tohoku University,* <sup>2</sup> *Formerly graduate student Department of Metallurgy, Tohoku University (now at Honda Motor Co.)*
- 15:30 SH02 Nano-sized Cr-N Cluster Formation in Fe-35Ni-10Cr Alloy during Low-temperature Plasma Nitriding**  
Yulin Xie<sup>1</sup>, Goro Miyamoto<sup>2,3</sup>, Tadashi Furuhashi<sup>2</sup>  
<sup>1</sup> *Graduate School of engineering, Tohoku University,* <sup>2</sup> *Institute for Materials Research, Tohoku University,* <sup>3</sup> *Research Center for Structure Materials, National Institute for Materials Science (NIMS)*
- 15:55 SH03 Correlational Study on Ground-state NH Radical Density and Nitriding Capability Using Atmospheric-pressure Plasma**  
Ryuta Ichiki, Kosuke Tachibana, Takashi Furuki, Seiji Kanazawa, *Oita University*
- 16:20 SH04 Rotational Bending Fatigue Property and Crack Stagnation Behavior in Nitrocarburized JIS SCM420 Steel**  
Naoya Ihara<sup>1</sup>, Takashi Iwamoto<sup>2</sup>, Kimihiro Nishimura<sup>3</sup>  
<sup>1</sup> *JFE Steel Corporation,* <sup>2</sup> *BAOWU JFE Special Steel Co., Ltd.,* <sup>3</sup> *JFE Techno-Research Corporation*
- 16:45 SH05 Reducing Costs and Energy Usage During Nitrocarburizing Operations in a Commercial Heat Treatment Plant**  
Nipon Taweejun<sup>1</sup>, Natnaree Senaweenin<sup>1</sup>, Putthitorn Dechopop<sup>1</sup>, Sankum Nusen<sup>2</sup>, Torranin Chairuangsi<sup>2</sup>, John TH. Pearce<sup>2</sup>  
<sup>1</sup> *Thai Tohken Thermo Co. Ltd.,* <sup>2</sup> *Department of Industrial Chemistry, Faculty of Science, Chiang Mai University*
- 17:10 SH06 Plasma Nitriding Properties of Sintered CoCrFeMnNi High-entropy Alloy with Pure Ni Screen**  
J. Peng, A. Nishimoto  
*Department of Chemistry and Materials Engineering, Kansai University*

**Room 313+314****November 14 - Tue**

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**Coating Technology**

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Chairpersons: Janusz Kowalewski (*Ipsen International, USA*)  
Kazuki Kawata (*Kawata PE Office, Japan*)

- 12:45 CT01 Fabrication of High-strength Composite Metal Thin Foil for Future Batteries Using Electroplating**  
Hyun Park, Yu-Jin Song, Han-Kyun Shin, Jung-Han Kim, Hyo-Jong Lee  
*Department of Materials Science and Engineering, Dong-A University*
- 13:10 CT02 Effect of Plasma Treatment on Copper Electrode to Enhance the Interfacial Stability for Anode-free Batteries Application**  
Byoung Rok Nah, *Heat & Surface Technology R&D Department, Korea Institute of Industrial Technology (KITECH), Division of Materials Science & Engineering, Hanyang University*
- 13:35 CT03 VSiC Coating with High Oxidation Resistance and Excellent Tribological Property**  
Satoru Habuka, Katsushige Shimizu, Kouji Abe  
*DOWA Thermotech Co., Ltd.*
- 14:00 CT04 Optimization for Industrial Applications by Mechanical Properties and Reducing Static/Dynamic Friction Coefficient of DLC Coatings**  
Akira Takahashi, *TOHKEN THERMO TECH Co., Ltd.*
- 14:25 Break**

## Thermochemical Treatment

Chairpersons: Marcel Somers (*Technical University of Denmark*)  
Koichiro Nambu (*Osaka Sangyo University, Japan*)

**15:05 TT01 In-situ Sensors for Nitrocarburizing Applications**

Emil Stålnacke, Sven Haglund, Erik Spolander, Magnus Dahlström Swerim  
*Bodycote, Linde*

**15:30 TT02 The Surface Transfer Kinetics of Carbon in Vacuum Carburizing**

Yanxiang Zhang, *Harbin Institute of Technology*

**15:55 TT03 Considerations of Low Temperature Active-screen Plasma Carburizing to an Austenitic Stainless Steel Small-diameter Thin Pipe**

Kenzo Sumiya<sup>1</sup>, Sinkichi Tokuyama<sup>1</sup>, Junichi Fukui<sup>1</sup>, Tatsuyuki Aoki<sup>1</sup>,  
Atsushi Nishiyama<sup>2</sup>, Akio Nishimoto<sup>3</sup>  
<sup>1</sup> *Hatta Kogyo Co. Ltd.*, <sup>2</sup> *Mikitec Co., Ltd.*, <sup>3</sup> *Kansai University*

**16:20 TT04 Development and Industrial Application of Ultra-rapid Carburizing Above Eutectic Temperature by Induction Heating**

Ryosuke Yamamoto<sup>1</sup>, Akio Nishimoto<sup>2</sup>  
<sup>1</sup> *JTEKT Thermo Systems Corporation*, <sup>2</sup> *Kansai University*

**16:45 TT05 Pulsed Electron Beam Processing of Boride Layer on L6 Steel**

Undrakh Mishigdorzhijn<sup>1</sup>, Nikolay Ulakhanov<sup>1</sup>, Alexander Semenov<sup>1</sup>,  
Maxim Vorobyov<sup>2</sup>, Pavel Moskvina<sup>2</sup>  
<sup>1</sup> *Institute of Physical Material Science SB RAS (Ulan-Ude, Russia)*,  
<sup>2</sup> *Institute of High Current Electronics SB RAS (Tomsk, Russia)*

**17:10 TT06 Surface Alloying of Stainless Steels with Nitrogen: Processing and Application**

Bo Wang, *Shanghai University*



Room 301+302

November 15 - Wed

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**Metallurgy and Properties of Heat Treated and/or Deformed Steels and Non-Ferrous Alloys II**

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Chairpersons: Massimo Pellizzari (*University of Trento, Italy*)  
Sigekazu Morito (*Shimane University, Japan*)

- 8:45 MP06 Investigation of the Effect of Heat Treatment on the Microstructure, Hardness and Wear Behavior of Pearlitic Rail Steel**  
Amporn Wiengmoon<sup>1</sup>, and Nattaya Tosangthum<sup>2</sup>  
<sup>1</sup> *Department of Physics, Faculty of Science, Naresuan University,* <sup>2</sup> *Particulate Materials Processing Technology Research Team, Thailand National Metal and Materials Technology Center*
- 9:10 MP07 Effect of Carbon and Tempering on Dislocation Density and Hardness in Lath Martensitic Steel with identical  $M_s$  Temperature**  
Takuro Masumura<sup>1</sup>, Keisuke Inami<sup>1</sup>, Toshihiro Tsuchiyama<sup>1</sup>, Shigenobu Nanba<sup>2</sup>  
<sup>1</sup> *Kyushu University,* <sup>2</sup> *Kobe Steel*
- 9:35 MP08 Effect of Nitrogen Content on Temperature Dependence of Grain Refinement Strengthening in Austenitic Stainless Steel**  
Tianze Ma, Takuro Masumura, Toshihiro Tsuchiyama, *Kyushu University*
- 10:00 MP09 Effect of Post-weld Heat Treatment on Creep Behavior of Heat-affected Zone in 2.25Cr-1Mo Steel**  
Shoichi Nambu, Masami Ichikawa, *The University of Tokyo*
- 10:25 Break**

**Metallurgy and Properties of Heat Treated and/or Deformed Steels and Non-Ferrous Alloys III**

Chairpersons: Antonio Carlos de Figueiredo Silveria (*Leibniz-Institut für Werkstofforientierte Technologien (IWT), Germany*)  
Shoichi Nambu (*University of Tokyo, Japan*)

- 10:55 MP10 Decomposition of Austenite into Pearlite from  $\alpha+\gamma$  Phase in Steels Having Different Microstructures before Intercritical Annealing**  
*Hiroshi Hasegawa, JFE Steel Corporation*
- 11:20 MP11 Influence of Post Heat Treatments on the Microstructure and Properties of Beta-Ti21S Alloy Produced by Laser Powder Bed Fusion for Lightweight Applications**  
*Lorena Emanuelli<sup>1</sup>, Alireza Jam<sup>2</sup>, Vassili Tonon<sup>2</sup>, Giorgio Valsecchi<sup>3</sup>, Carlo Lora<sup>4</sup>, Matteo Benedetti<sup>2</sup>, Massimo Pellizzari<sup>2</sup>*  
*<sup>1</sup> INSTM (Operative center: University of Trento), <sup>2</sup> University of Trento, <sup>3</sup> TAV, <sup>4</sup> SISMA SpA*
- 11:45 MP12 Precipitation Mode and Kinetics of Laves Phase on a Eutectoid Type Reaction ( $\delta \rightarrow \gamma + \text{Laves}$ ) in High Cr Ferritic Alloys**  
*Zhetao Yuan, Mikael Perrut, Satoru Kobayashi, Tokyo Institute of Technology*
- 12:10 MP13 Demonstrating Duplex TRIP/TWIP Titanium Alloys by Introducing Metastable Retained  $\beta$ -phase**  
*Kenta Yamanaka<sup>1</sup>, Karri Sri Naga Sessa<sup>1</sup>, Manami Mori<sup>1,2</sup>, Yusuke Onuki<sup>3</sup>, Shigeo Sato<sup>4</sup>, Damien Fabrègue<sup>5,6</sup>, Akihiko Chiba<sup>1</sup>*  
*<sup>1</sup> Institute for Materials Research, Tohoku University <sup>2</sup> Department of General Engineering, National Institute of Technology, Sendai College, <sup>3</sup> Frontier Research Center for Applied Atomic Sciences, Ibaraki University <sup>4</sup> Graduate School of Science and Engineering, Ibaraki University <sup>5</sup> Université de Lyon, INSA-Lyon, <sup>6</sup> ELyT Max, Tohoku University*
- 12:35 Exhibition Introduction and Lunch**

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**Heat Treatment & Surface Engineering Summit**

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**15:30-17:30**Chairperson: Prof. Masahiro Okumiya, (*Toyota Technological Institute, JSHT and IFHTSE*)**15:35 HTS1 Trends in the US Heat Treatment Industry**Janusz Kowalewski, *Ipsen International, USA***15:55 HTS2 Heat Treatment Situation in Europe**Prof. Rainer Fechte-Heinen,  
*Leibniz-Institut für Werkstofforientierte Technologien - IWT, Germany***16:15 HTS3 Heat treatment market in Asia**Seiji Kaga, *Dowa Thermotech Co., Ltd. Japan***16:35 HTS41 Trends in Japan's Metal Heat Treatment Industry**Toshiki Hara, *Japan Metal Heat Treatment Industry Association, Vice Chairman*  
*METAL HEAT Co., Ltd., Representative Director, Japan***HTS41 Recent Trend of Research and Development on Heat Treatment Technology in Japan**Dr. Yoichi Watanabe, *Japan Society for Heat Treatment, Vice President,*  
*NIHON PARKERIZING CO., LTD., Fellow, Japan***17:00 Question & Answer, Discussion**

## Room 304

November 15 - Wed

### Thermal Processing of Iron and Steels II

Chairpersons: L. H. Chiu (*Tatung University, Taiwan*)  
Nobuo Nakada (*Tokyo Institute of Technology, Japan*)

#### 8:45-9:25 Keynote Lecture 4

8:45 **KL04** **Microstructure Control of a Medium Manganese Steel by Combined Interrupted Quenching and Intercritical Annealing**  
Prof. Toshihiro Tsuchiyama, *Kyushu University*

9:25 **TP06** **Effects of Fine Metal Compounds on Hydrogen Embrittlement Resistance**  
Miyu Sato, Masahiro Yamada, Chikara Ohiki, *NTN corporation*

9:50 **TP07** **Yielding Behavior of Martensitic Steel Sheet Containing Retained Austenite**  
Junya Tobata, Hidekazu Minami, Yuki Toji, Hideyuki Kimura, Shinjiro Kaneko  
*JFE Steel Corporation*

10:25 **Break**

### Thermal Processing of Iron and Steels III

Chairpersons: Kaixuan Gu (*Tech Phys. Chem., China*)  
Manabu Takahashi (*Kyushu University, Japan*)

10:55 **TP08** **Liquid Nitrocarburizing with Low Environmental Impact for Tribological Applications: Heat Transfer & Energy Management**  
Takashi Kanamori, *H.E.F. DURFERRIT JAPAN, Co. Ltd*

11:20 **TP09** **Development of Carbonitriding Processes Combining Vacuum Carburizing and Atmospheric Pressure Nitriding**  
Yukihiro Hayashi, Kenta Hayashi, Kenta Tsujii, Ayumi Yamazaki, *Daido Steel Co., Ltd.*

11:45 **TP10** **Effect of Gas Quenching Rate on Microstructure and Hardness of SAE 1078 Steel during Austempering Treatment**  
Gi-hoon Kwon<sup>1,2</sup>, Hyunjun Park<sup>1</sup>, Kuk-hyun Yeo<sup>1</sup>, Young-Kook Lee<sup>2</sup>, Sang-gweon Kim<sup>1</sup>  
<sup>1</sup> *Heat & Surface Technology R&D Group, Korea Institute of Industrial Technology,*  
<sup>2</sup> *Department of Materials Science and Engineering, Yonsei University*

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November 15 - Wed

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## Surface Hardening II

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Chairpersons: Sankum Nusen (*Chiang Mai University, Thailand*)  
Satoru Kobayashi (*Tokyo Institute of Technology, Japan*)

- 8:45 SH10** Aluminizing Process on Ni-base Superalloy by Spark Plasma Sintering Method  
*Akio Nishimoto, Kan Nakazawa, Department of Chemistry and Materials Engineering, Faculty of Chemistry, Materials and Bioengineering, Kansai University*
- 9:10 SH11** Effect of Carbon and Nitrogen Concentrations on the Structure Formation of Compound Layer in Nitrocarburizing  
*Yuya Gyotoku, Kawasaki Motors, Ltd.*
- 9:35 SH12** Improvement of an Electromagnetic-thermal-mechanical Coupled Simulation for the Optimization of Complex Processes in Induction Hardening  
*Benjamin Dollhofer, Stefan Dietrich, Volker Schulze, Institute for Applied Materials – Materials Science and Engineering, Karlsruhe Institute of Technology*
- 10:00 Break**

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## Surface Hardening III

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Chairpersons: Akio Nishimoto (*Kansai University, Japan*)  
Ing-Song Yu (*National Dong Hwa University, Taiwan*)

- 10:55 SH13** Comparison of Hardness and Residual Stresses in Multiline Laser Surface Hardening and Induction Hardening  
*Philipp Schüßler, Niki Nouri, Stefan Dietrich, Volker Schulze, Karlsruhe Institute of Technology, Institute for Applied Materials - Materials Science and Engineering (IAM-WK)*
- 11:20 SH14** Nitriding Process of WC-Co and Evaluation of Fundamental Characteristics  
*Yasuhiro Hara<sup>1</sup>, Tamio Hara<sup>1</sup>, Masahiro Okumiya<sup>2</sup>*  
*<sup>1</sup> Plasma Research Institute Co., Ltd., <sup>2</sup> Toyota Technological Institute*

## Shot Peening I

Chairpersons: Pedro Jose de Castro (*Leibniz-Institut für Werkstofforientierte Technologien - IWT, Germany*)  
Yuji Kobayashi (*Sintokogio, Japan*)

- 8:45 SP01 Combined Effects of Surface Dent and Residual Stress Generated by Shot Peening on Fatigue Properties of Induction Hardened Steel with Different Hardness**  
Shoichi Kikuchi<sup>1</sup>, Keisuke Ono<sup>2</sup>, Koichiro Nambu<sup>3</sup>, Shogo Takesue<sup>4</sup>  
<sup>1</sup> *Shizuoka University, Graduate school of Integrated Science and Technology*, <sup>2</sup> *Shizuoka University*, <sup>3</sup> *Osaka Sangyo University*, <sup>4</sup> *Kyoto Institute of Technology*
- 9:10 SP02 Effect of Nozzle Diameter on Particle Velocity in Fine Particle Peening Processes**  
Koichiro Nambu<sup>1</sup>, Yusuke Saeki<sup>2</sup>, Masahiro Okumiya<sup>2</sup>  
<sup>1</sup> *Osaka Sangyo University*, <sup>2</sup> *Toyota Technological Institute*
- 9:35-10:15 Keynote Lecture 6**  
Chairpersons: Yuji Kobayashi (*Sintokogio, Japan*)  
Pedro Jose de Castro (*Leibniz-Institut für Werkstofforientierte Technologien - IWT, Germany*)
- 9:35 KL06 Effects of Laser Peening on the Very High Cycle Fatigue Strength of Additively Manufactured Maraging Steel**  
Prof. Koji Takahashi, *Yokohama National University*
- 10:15 Break**

## Shot Peening II

Chairpersons: Miroslaw Bonek (*Silesian University of Technology, Poland*)  
Yutaka Kameyama (*Tokyo City University, Japan*)

- 10:55 SP05 Process Integration of Innovative Mechanical Surface Treatment Methods with Induction Surface Hardening**  
Stefan Dietrich, Raphael Heudorfer, Volker Schulze  
*Institute for Applied Materials - Werkstoffkunde, KIT*
- 11:20 SP06 X-ray Computational Tomography Non-destructive Observation of Modified Microstructure Created by Fine Particle Peening**  
Takumi Kusakari<sup>1</sup>, Hikaru Suzumoto<sup>1</sup>, Kiyotaka Masaki<sup>2</sup>, Yutaka Kameyama<sup>3</sup>  
<sup>1</sup> *Tokyo City University Graduate School*, <sup>2</sup> *Saitama Institute of Technology*, <sup>3</sup> *Tokyo City University*



## Room 311+312

November 15 - Wed

## Industrial Heat &amp; Surface Treatment Equipment

Chairpersons: Yutaka Kameyama (*Tokyo City University, Japan*)  
Miroslaw Bonek (*Silesian University of Technology, Poland*)

**11:50 IE01 Discoloration in the Vacuum Furnace: A Guideline for Heat Treaters for Contamination Identification and Prevention**  
Janusz Kowalewski, *Ipsen International*

**12:15 IE02 Research and Development of Heat Treatment Production Line with Type of Trolley for High Quality Train Wheels**  
Li Xianjun, Zhang Wenliang, Luo Ping, Sun Lizhuang, Liu Junjie, Yang Tao,  
Wu Xiaolin, Hao Yuan  
*Beijing Research Institute of Mechanical & Electrical Technology*

## Room 313+314

## Quenching Technology

Chairpersons: Stefan Hock (*IFHTSE*)  
Manabu Kubota (*Nippon Steel Corp., Japan*)

**8:45 QT01 Effect on Hardness and Distortion by Replacing Quenching Oils with Aqueous Polymer Quenchants.**  
Takahito Sugiura, Haruka Ouchi, *Idemitsu Kosan Co.,Ltd.*

**9:10 QT02 Comparison between Oil Quenching and Gas Quenching**  
Yasuhiro Nakadai, *AIR LIQUIDE Japan G.K.*

**9:35 QT03 Application of Group III Base Oil to Heat Treating Oils**  
Daiki Kamino, Takuro Aikawa, Serina Kinoshita, Seiji Hashimoto,  
Yosuke Okuzumi, *NIPPON GREASE Co.,Ltd.*

**QT04 Cancelled**

**10:00 Break**

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November 15 - Wed

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## Modelling and Simulation of Thermal Processes and Surface Engineering II

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Chairpersons: Zbigniew Brytan (*Mechaniczny Technologiczny, Poland*)  
Takashi Horino (*Neturen Co. Ltd., Japan*)

**MS04** *Cancelled*

- 11:20 **MS05** **Numerical Simulation of Low Pressure Carburizing Incorporating Part Geometry**  
Katsushige Shimizu<sup>1</sup>, Satoru Habuka<sup>1</sup>, Koji Abe<sup>1</sup>, Ikuo Shohji<sup>2</sup>  
<sup>1</sup>*DOWA Thermotech Co., Ltd.*, <sup>2</sup>*Gunma University*
- 11:45 **MS06** **Recent Attempts to Control Heat Treatment Distortion Using Simulation in Japan**  
Kyozo Arimoto, *Arimotech Ltd.*
- 12:10 **MS07** **The Current Status of Simulation on Various Heat Treatment**  
Tomonori Imahashi, *Yamanaka-Eng. Co., Ltd*

## Room 301+302

November 16 - Thu

## Physical Metallurgy in Heat Treatment and Surface Engineering I

Chairpersons: Chin-Pao Cheng (*National Taiwan Normal University, Taiwan*)  
Kaneharu Okuda (*JFE Steel Corp., Japan*)

**8:45 PM01 Influence of Alloying Elements on the Transformation Behavior of Medium Manganese Steels**

Daniel David<sup>1,2</sup>, Reinhold Schneider<sup>1</sup>, Gerald Klösch<sup>3</sup>, Christof Sommitsch<sup>2</sup>  
<sup>1</sup> *University of Applied Sciences Upper Austria*, <sup>2</sup> *Institute of Materials Science, Joining and Forming, Graz University of Technology*, <sup>3</sup> *voestalpine Stahl Donawitz GmbH*

**9:10 PM02 Intercritical Annealing of a PH 13-8 Mo Maraging Steel**

Andreas Rosenauer<sup>1</sup>, Dominik Brandl<sup>2</sup>, Gerald Ressel<sup>2</sup>, Manfred Stadler<sup>3</sup>,  
Martin Stockinger<sup>4</sup>, Ronald Schnitzer<sup>1</sup>  
<sup>1</sup> *Department of Materials Science, Montanuniversität Leoben*, <sup>2</sup> *Materials Center Leoben Forschung GmbH*, <sup>3</sup> *voestalpine BÖHLER Edelstahl GmbH & Co KG*, <sup>4</sup> *Department Product Engineering, Montanuniversität Leoben*

**9:35 PM03 Microscopic Internal Stress Generated via Martensitic Transformation in As-quenched Martensitic Steels**

Daisuke Fukui, Ryota Nagashima, Nobuo Nakada, *Tokyo Institute of Technology*

**10:00 Break**

## Physical Metallurgy in Heat Treatment and Surface Engineering II

Chairpersons: Reinhold Schneider (*University of Applied Sciences Upper Austria*)  
Ikuo Ohnuma (*National Institute for Materials Science, Japan*)

**10:30 PM04 Effect of Alloying Elements and Their Microsegregation on Pearlite Band Occurrence in Steels**

Hyunje Sung, Minwoo Kang, *Fundamental Materials Research Center, Hyundai Motor Company*

**10:55 PM05 Effects of the Temperature History Following Nitriding Treatment on the Phase Composition of the Formed Compound Layer**

Katsushige Shimizu<sup>1</sup>, Soichiro Nogami<sup>1</sup>, Koji Abe<sup>1</sup>, Ikuo Shohji<sup>2</sup>  
<sup>1</sup> *DOWA Thermotech Co., Ltd.*, <sup>2</sup> *Gunma University*

**11:20 PM06 Effect of Carbide Morphology on Grain Refinement in Burnishing**  
Yoshinori Amano, Takahisa Suzuki, Kaori Kawano, *Nippon Steel Corporation*

## Room 304

November 16 - Thu

### Testing & Characterization of Heat & Surface Treated Components I

Chairpersons: Emil Stålnacke (*Swerim AB, Sweden*)  
Daisuke Kuroda (*National Institute of Technology, Suzuka College, Japan*)

**TC01** *Cancelled*

**9:10** **TC02** **Effects of Surface Microstructure on Low Cycle Bending Fatigue Strength of Gas Carburized Low Alloy Steel**  
*Ai Goto, Masato Yuya, Osamu Kada, Nippon Steel Corporation*

**9:35** **TC03** **Development of Effective Case Depth Measurement Technology by Non-Destructive Inspection for Induction Hardened Parts**  
*Nozomi Shigematsu, Shun Onita, Wataru Ninomiya, Takashi Horino, Yoshitaka Misaka, Yuji Gotoh, NETUREN Co., Ltd., Oita University*

**10:00** **Break**

### Testing & Characterization of Heat & Surface Treated Components II

Chairpersons: Bo Wang (*Shanghai University, China*)  
Aki Kodai (*Kawasaki Heavy Industries Ltd., Japan*)

**10:30** **TC04** **Acicular Structure Formation under Rolling Contact Fatigue of Carburized SAE5120**  
*Daisuke Takazaki, Masato Yuya, Takahide Umehara, Makoto Kosaka, Kaori Kawano Nippon Steel Corporation*

**10:55** **TC05** **Effect of Manganese on Work-hardening of As-quenched Martensitic Steels**  
*Kotaro Ueno<sup>1</sup>, Rina Fujimura<sup>1</sup>, Masatoshi Mitsuhara<sup>1</sup>, Koutarou Hayashi<sup>2</sup>, Shunji Hiwatashi<sup>2</sup>, Manabu Takahashi<sup>1</sup>*  
*<sup>1</sup> Kyushu University, <sup>2</sup> Nippon Steel Corporation*

## Room 315

November 16 - Thu

## Brazing I

Chairpersons: Hyun Park (*Dong-A University, Korea*)  
Makoto Hasegawa (*Yokohama National University, Japan*)

- 8:45 BR01 Understanding Key Vacuum Brazing Process Parameters for Aluminum, Ceramic Brazing, and Compression Brazing**  
*Janusz Kowalewski, Ipsen International*
- 9:10 BR02 CALPHAD Coupled Phase-field Simulation of Microstructural Evolution during Active Metal Brazing with Ag-Cu-Sn-Ti Alloy**  
*Takumi Morino<sup>1</sup>, Shoichi Hirose<sup>1</sup>, Machiko Ode<sup>2</sup>, Taichi Abe<sup>2</sup>, Yoichiro Mori<sup>3</sup>, Seiichi Suenaga<sup>3</sup>*  
*<sup>1</sup> Yokohama National University, <sup>2</sup> National Institute of Materials Science, <sup>3</sup> Toshiba Materials Co.,Ltd.*
- 9:35 BR03 In-Situ Observation of Molten Brazing Filler Metal with New Joint Design Specimen**  
*Hikaru Tajima, Yasuyuki Miyazawa, Tokai University*
- 10:00 Break**

## Brazing II

Chairpersons: Janusz Kowalewski (*Ipsen International, USA*)  
Keiji Kubushiro (*IHI Corp., Japan*)

- 10:30 BR04 Effect of Boron Content and Brazing Temperature on Braze Ability of Foil Type Ni-Based Brazing Filler Metal**  
*Yuki Koibuchi, Tokai University*
- 10:55 BR05 Elucidation of Wetting Mechanism of Aluminum Brazing on Silicon Nitride by High-temperature Wettability Tests**  
*Takumi Kusumoto, Mitsuhiro Ootaki, Shoichi Hirose, Yokohama National University*
- 11:20 BR06 Interfacial Reaction of Flux-Free Brazing of Aluminum by Different Heating Methods**  
*Atsuya Kato, Tokai University*

## Artificial Intelligence, Process Control, and Reliability in Thermal Processing and Surface Engineering

Chairpersons: Klauss Löser (*ALD Vacuum Technologies GmbH, Germany*)  
Tsuyoshi Sugimoto (*National Institute of Technology, Asahikawa College, Japan*)

**8:45 AI01 Machine Learning Based Optimization Method for Vacuum Carburizing Process and Its Application**

Honghao Jia<sup>1</sup>, Dongying Ju<sup>1,2</sup>, Jianting Cao<sup>1</sup>  
<sup>1</sup>Saitama Institute of Technology, <sup>2</sup> Tokyo Green Power Electric Technology, Co., Ltd.

**9:10 AI02 Hybrid Modelling of Austempering in the Automotive Industry**

Jonathan Wörner<sup>1</sup>, Dr.-Ing. Thomas Waldenmaier<sup>1</sup>, Dr.-Ing. László Hagymási<sup>1</sup>, Prof. Dr.-Ing. habil. Volker Schulze<sup>2</sup>, <sup>1</sup> Robert Bosch GmbH, <sup>2</sup> KIT Karlsruhe, Institute for Applied Materials – Material Science and Engineering (IAM-WK)

**9:35 AI03 Development of an Intelligent Design and Simulation Aid System for Heat Treatment Processes Based on LLM**

Yixiao Sun, Chao Liu, Xiaohu Deng, Jiangang Wang, Zeyu Zhang, Tianyu Song, DongYing Ju, University of Science and Technology Liaoning

**10:00 Break**

## Energy Savings and CO<sub>2</sub>-Reduction

Chairpersons: Jonathan Wörner (*Robert BOSCH GmbH, Germany*)  
Akio Nishimoto (*Kansai University, Japan*)

**10:30 ES01 Reducing CO<sub>2</sub> Emissions by Using Carburizing Gas Regenerator**

Toshikazu Yoshii, CHUGAI RO Co., Ltd.

**10:55 ES02 Contribution from Materials to the Stable Operation of Bearings in Wind Turbine Gearboxes**

Toshiyuki Hamano, Sanyo Special Steel Co.,Ltd.

**11:20 ES03 CO<sub>2</sub>-Reduction by Energy-efficient Vacuum Heat Treatment Processes and Plants**

Klaus Loeser, Ben Kahle, Gunther Schmitt, ALD Vacuum Technologies GmbH



Program

# Poster Presentations

November 15 - Wed 13:30 - 15:00

Front (Land side) Foyer

## Artificial Intelligence, Process Control, and Reliability in Thermal Processing and Surface Engineering

- AI04(P1)** Prediction of Microstructure Formation during Heating in Low-carbon Steels Using Machine Learning  
Koutarou Hayashi, *Nippon Steel Corporation Research & Development*

## Coating Technology

- CT05(P2)** Development of Tribo-Simulator for Cold Forging Lubricants  
Wataru Shimabukuro<sup>1</sup>, Yusuke Nakamura<sup>1</sup>, Shinobu Komiyama<sup>1</sup>, Shohei Shimizu<sup>2</sup>, Tomoyuki Hakoyama<sup>2</sup>, Zhigang Wang<sup>2</sup>  
<sup>1</sup> Nihon Parkerizing Co., Ltd., <sup>2</sup> Gifu University (Tokai National Higher Education and Research System)
- CT06(P3)** Effect of Plasma Nitriding on Multilayer Diamond-Like Carbon Films  
Yusei Ogawa, Akio Nishimoto, *Department of Chemistry and Materials Engineering, Kansai University*

- CT07(P4)** **A Comparative Study on the Properties of Alloy Tool Steel According to the Presence or Absence of Heat Treatment Using Laser Cladding**  
Cheol Woo Kim, *Korea Institute of Industrial Technology*
- CT08(P5)** **Effect of DLC and Si-DLC Films Deposited on Engineering Plastics on Tribological Properties**  
Kentaro Tatsumi, Akio Nishimoto, *Department of Chemistry and Materials Engineering, Kansai University*
- CT09(P6)** **A Study on the Multifunctional Plasma Coating Process for Improvement of Thermal Fatigue Properties of Die Casting Molds**  
Hyunjun Park<sup>1</sup>, Gihoon Kwon<sup>1</sup>, Dongsul Jeon<sup>1</sup>, Seokwon Son<sup>1</sup>, Kukhyun Yeo<sup>1</sup>, Hanchan Lee<sup>2</sup>  
<sup>1</sup> *Korea Institute of Industrial Technology*, <sup>2</sup> *EMS Co.*
- CT10(P7)** **Synthesis of Carbon Films Using Substrate-grounded MVP Method**  
Yuri Yoshimoto, Ippei Tanaka, Yasunori Harada, *University of Hyogo*
- CT11(P8)** **Effects of Sandblasting on Adhesion Resistance of PVD Films**  
Yusuke Ushiro<sup>1</sup>, Ippei Tanaka<sup>2</sup>, Hiroyuki Yoshida<sup>3</sup>, Yasunori Harada<sup>2</sup>, Takashi Ogisu<sup>1</sup>  
<sup>1</sup> *Umetoku Co. Ltd.*, <sup>2</sup> *Graduate School of Engineering, University of Hyogo*, <sup>3</sup> *University of Hyogo*
- CT12(P9)** **Corrosion Behavior of 316L Stainless Steel Arc-coated ZrTiAgN Multilayer Film in Media Containing Chloride**  
Chun-Yin Lin, Mu-Jou Ho, Cheng-Hsun Hsu  
*Department of Mechanical and Materials Engineering, Tatung University*
- CT13(P10)** **Effect of CH<sub>4</sub> Concentration Modulation on Diamond Films Prepared by Microwave Plasma CVD**  
Ryota Ohnishi, Ippei Tanaka, Natsuki Kawaguchi, Yasunori Harada, *University of Hyogo*
- CT14(P11)** **Diamond Synthesis Using Tubular Hot-foil CVD**  
Ippei Tanaka, Masashi Higami, Yasunori Harada,  
*University of Hyogo*

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## Energy Savings and CO<sub>2</sub>-Reduction

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- ES04(P12)** **Preparation of a Ni-based Li-Al Layered Double Hydroxide (LDH) Structured Catalyst and its Application in Hydrogen Generation**  
Song-Hui Huang, Jun-Yen Uan, *National Chung Hsing University*

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## Industrial Heat & Surface Treatment Equipment

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- IE03(P13)** **Research and Development of Heat Treatment Production Line with Type of Trolley for High Quality Train Wheels**  
Li Xianjun, Zhang Wenling, Luo Ping, Sun Lizhuang, Liu Junjie, Yang Tao, Wu Xiaolin, Hao Yuan, *Beijing Research Institute of Mechanical & Electrical Technology*
- IE04(P14)** **Cryogenic Treatment Technology and Equipment for High-end Manufacturing**  
Jia Guo, Kaixuan Gu, Zeju Weng, Chen Cui, Junjie Wang  
*CAS Key Laboratory of Cryogenics, Technical Institute of Physics and Chemistry, Beijing, China*
- IE05(P15)** **Deformation Properties of Induction Heating Coils Made by 3D Additive Manufacturing Using Electron Beam Melting**  
Ipppei Ohnuma, Atsushi Sakurai, Naoko Teranishi, *NDK Inc.*
- IE06(P16)** **Micro Component Heat Treatment Collecting Technology**  
Chia-Hung Huang, Yu-Lin Chung, Jiun-Cherng Liu, Chi-Hui Chen, Ting-Kuei Yeh  
*Metal Industries Research & Development Centre (MIRDC)*
- IE07(P67)** **Calibration of Temperature and Pressure in the Electroconsolidation Process**  
Kyong Jun An, Dong Sul Jeon  
*Korea Institute of Industrial Technology, Korea*

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## Metallurgy and Properties of Heat Treated and/or Deformed Steels and Non-Ferrous Alloys

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- MP14(P17)** **Development of 900MPa Category High Strength Non-heat Treatment Steels for Connecting Rod**  
Akihiro Owaki, and Shuzo Saito  
*Metallurgical Engineer, Wire Rod and Bar Products Development Dept., R&D Laboratory, Iron and Steel Business, Kobe Steel, Ltd.*
- MP15(P18)** **Grain Growth Behavior in Electrodeposited Nanocrystalline FeCoNi Medium-entropy Alloy**  
Atsuya Watanabe<sup>1</sup>, Takahisa Yamamoto<sup>2</sup>, Koichiro Nambu<sup>3</sup>, Yorinobu Takigawa<sup>1</sup>  
<sup>1</sup> *Department of Materials Science, Osaka Metropolitan University,*  
<sup>2</sup> *Department of Materials Design Innovation Engineering, Nagoya University,*  
<sup>3</sup> *Department of Mechanical Engineering, Osaka Sangyo University*

- MP16(P19) Effect of High-temperature Hydrogen Exposure on Microstructure of 18Cr Doped Fe-Ni Based Alloys**  
Yuki Tsuda, Satoru Kobayashi, *Tokyo Institute of Technology*
- MP17(P20) Interfacial Microstructure and Fracture Behavior of Fe/Ni Interface by Solid-state Compressive Bonding**  
Sien Liu, Shoichi Nambu, *Department of Materials Engineering, The University of Tokyo*
- MP18(P21) Effect of Microstructure on Torsional Fatigue Endurance of Martensitic Carbon Steels and Numerical Simulation of Fatigue Crack Initiation in High Strength Steel**  
Shunsuke Toyoda<sup>1</sup>, Jun'ichi Sakai<sup>2</sup>  
<sup>1</sup> *The Japan Society for Heat Treatment*, <sup>2</sup> *Kagami Memorial Res. Inst. for Mater. Sci. and Technol. of Waseda University*
- MP19(P22) Control of Microstructures and the Practical Properties of Thin-walled Hot-rolled High-Strength Steels**  
Shunsuke Toyoda<sup>1</sup>, Jun'ichi Sakai<sup>2</sup>,  
<sup>1</sup> *The Japan Society for Heat Treatment*, <sup>2</sup> *Kagami Memorial Res. Inst. for Mater. Sci. and Technol. of Waseda University*
- MP20(P23) Grain Refinement of Austenitic Heat Resistant Steels Strengthened by Grain Boundary Precipitates**  
Boxuan Li, Zhetao Yuan, Hirotoyo Nakashima, Satoru Kobayashi, Masao Takeyama  
*Tokyo Institute of Technology*
- MP21(P24) Effect of Thermal History on Microstructures of Spot Welding in Advanced High Strength Steel**  
Koichi Taniguchi<sup>1</sup>, Ryo Kakimoto<sup>2</sup>, Shoichi Nambu<sup>2</sup>, Satoshi Igi<sup>1</sup>  
<sup>1</sup> *JFE Steel Corporation*, <sup>2</sup> *University of Tokyo*
- MP22(P25) Effect of Cu Addition on Delayed Fracture Resistance of Low Carbon 1470 MPa Grade Thin-walled Martensite Steel**  
Shunsuke Toyoda<sup>1</sup>, Jun'ichi Sakai<sup>2</sup>  
<sup>1</sup> *The Japan Society for Heat Treatment*, <sup>2</sup> *Kagami Memorial Res. Inst. for Mater. Sci. and Technol. of Waseda University*

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## Modelling and Simulation of Thermal Processes and Surface Engineering

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- MS04(P26) AI Assisted Estimation of Distortion Occurring Additive Manufacturing**  
Ákos Szabó-Gali, Zoltán Biczó, Imre Felde, *Obuda University*

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## Physical Metallurgy in Heat Treatment and Surface Engineering

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**PM07(P27) Effect of Laser Surface Treatment on Structure and Properties of a Commercial Tool Steels**

Mirosław Bonek, *Silesian University of Technology*

**PM08(P28) Morphology and Crystallography of Plate-like Lower Bainite in Fe-C Alloys**

Shigekazu Morito, Taisuke Hayashi, Anh Hoang Pham, Takuya Ohba  
*Shimane University*

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## Quenching Technology

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**QT05(P29) Effect of Non-uniform Cooling on Distortion and Ellipticity in Bearing Quenching**

Xusheng Li<sup>1</sup>, Dongying Ju<sup>1,2</sup>, Jianting Cao<sup>1</sup>, Kousuke Ishikawa<sup>2</sup>

<sup>1</sup> *Saitama Institute of Technology,*

<sup>2</sup> *Tokyo Green Power Electric Technology, Co., Ltd., Tokyo*

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## Residual Stresses and Distortion

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**RS04(P30) Hardness, Microstructure and Residual Stress at the Surface of Gyro Finished Martensitic Steel**

Ryusei Kato, Reiya Yamazaki, Atsushi Yamashita, Norimitsu Koga, Kohei Yamaya, Kenta Miyake, Yohei Hashimoto, *Kanazawa University*

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## Shot Peening

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**SP03(P31) Joining of Corrosion-resistant Metal Foil to Magnesium Alloy by Shot Peening**

Yasunori Harada, Toshiaki Hosaka, Kenta Sugihara, Ippei Tanaka, *University of Hyogo*

**SP04(P32) Effect of Shot Peening on the Retained Austenite and Residual Stress of Carburized Cases**

Shao Quan Lu, Liu Ho Chiu

*Department of Mechanical and Materials Engineering, Tatung University*

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## Surface Hardening

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**SH07(P33) Effect of Nitriding Conditions on 304 Stainless-steel Plasma Nitrided with Ni Screen**

Masaki Kuribayashi, Akio Nishimoto

*Department of Chemistry and Materials Engineering, Kansai University*

**SH08(P34) Formation of Aluminum Nitride Layer on Aluminum Surfaces Using an Electric Discharge Process in Liquid Nitrogen**

Shunsuke Matsubara, *Graduate School of Engineering, Daido University*

**SH09(P35) Room Temperature Nitriding of Pure Titanium Using Atmosphere Controlled Scanning Cyclic Press**

Yuta Funaki<sup>1</sup>, Nao Fujimura<sup>1</sup>, Takashi Nakamura<sup>1</sup>, Kosuke Takahashi<sup>1</sup>, Tatsuki Wajima<sup>2</sup>, <sup>1</sup> *Hokkaido University*, <sup>2</sup> *Hybridge Co. Ltd.*

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**Testing & Characterization of Heat & Surface Treated Components**

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**TC06(P36) Improved Performance of Sintered Alloys by Spark Plasma Sintering of Gas-atomized CoCrFeNi-Si High-entropy Alloy Powders with Ball Milling**

Zixiang Fan and Akio Nishimoto,  
*Department of Chemistry and Materials Engineering, Kansai University*

**TC07(P37) Evaluation of Mass Effect in Small Ball Rebound Hardness Test**

Masayuki Yamamoto, *Yamamoto scientific tool lab. Co., Ltd.*

**TC08(P38) Heat Treatment Effect on the Microstructural and Property Changes of Bearing Steels**

L. H. Chiu, Y.S. Chen, X. Lin, J. Hu, Chung-Chun Wu  
*Department of Mechanical Engineering and Materials Engineering, Tatung University*

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**Thermal and Thermochemical Treatment in Additive Manufacturing**

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**AM04(P39) Evaluation of Physical Properties of Pure Copper Fabricated by Electron Beam 3D Printer**

Yohei Daino<sup>1</sup>, Takashi Satoh<sup>1</sup>, Kazuhiro Masuda<sup>1</sup>, Shinichi Kitamura<sup>1</sup>, Ippei Ohnuma<sup>2</sup>  
<sup>1</sup> *JEOL Ltd.*, <sup>2</sup> *NDK Inc.*

**AM05(P40) Heat Treatment Effects on LPBF Duplex Stainless Steel Corrosion Resistance**

Zbigniew Brytan, Mengistu. Dagnaw, *Silesian University of Technology*

**AM06(P41) Change in Hardness and Microstructure during Cumulative Heating of Tool Steel H13**

Kouji Tanaka, Yuki Kodama, Shuta Nishikawa, Yuya Fukutomi, *Daido University*

**AM07(P42) Short-time Induction Treatment to Improve Fatigue Strength and Wear Resistance of Ti-6Al-4V Alloy Formed by Laser Powder Bed Fusion**

Koki Matsumoto<sup>1</sup>, Li He<sup>1</sup>, Shogo Takesue<sup>1</sup>, Yoshitaka Misaka<sup>2</sup>, Tatsuro Morita<sup>1</sup>  
<sup>1</sup> *Kyoto Institute of Technology*, <sup>2</sup> *Neturen Co., Ltd.*



AM08(P43) *Cancelled*

AM09←TP18(P51)

**Effect of Post-heat Treatment on Mechanical Properties of Additively Manufactured 17-4PH Stainless Steel Lattice Structures**

Satoru Ishido<sup>1</sup>, Satoshi Okubo<sup>2</sup>, Koichi Kitazono<sup>1</sup>

<sup>1</sup> *Tokyo Metropolitan University,*

<sup>2</sup> *Tokyo Metropolitan Industrial Technology Research Institute*

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## Thermal Processing of Iron and Steels

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**TP11(P44) Effects of Initial Quenching Temperature on Microstructure and Mechanical Properties of 60Si2CrVAT Spring Steel under Quenching-Partitioning Process**  
Engang Wang, Yunchao Li, Lin Zhang, *Northeastern University, P. R. China*

**TP12(P45) Simulation Study on Vacuum Gas Quenching of Cold Working Dies**  
Fan Zhenyu<sup>1</sup>, Wang Huizhen<sup>1</sup>, Yan Deng<sup>2</sup>, Qiang Wang<sup>2</sup>, Yuewen Zhai<sup>1</sup>, Chao Jiang<sup>1</sup>, Leyu Zhou<sup>1</sup>, Zhiqiang Li<sup>1</sup>, and Yuheng Zhan<sup>3</sup>  
<sup>1</sup> *Beijing Research Institute of Mechanical and Electrical Technology Co., Ltd. CAM,*  
<sup>2</sup> *Faw Tooling Die Manufacturing Co.,Ltd.,*  
<sup>3</sup> *Beijing Institute of Technology*

**TP13(P46) Influence of Partitioning on Mechanical Properties and Retained Austenite Stability of Martensitic Stainless Steels**  
Simona Kresser<sup>1,2</sup>, Reinhold Schneider<sup>1</sup>, Horst Zunko<sup>3</sup>, Christof Sommitsch<sup>2</sup>  
<sup>1</sup> *University of Applied Sciences Upper Austria,*  
<sup>2</sup> *Institute of Materials Science, Joining and Forming, Graz University of Technology,*  
<sup>3</sup> *voestalpine BÖHLER Edelstahl GmbH & Co KG*

**TP14(P47) Effect of Aluminum Addition on Martensitic Transformation in Medium Carbon Steel**  
Yusaku Shirakami<sup>1</sup>, Takuro Masumura<sup>1</sup>, Toshihiro Tsuchiyama<sup>2</sup>, Shigenobu Nanba<sup>3</sup>,  
<sup>1</sup> *Department of Materials, Kyushu University,*  
<sup>2</sup> *Department of Materials, Kyushu University,* <sup>3</sup> *Materials Research laboratory, Kobe Steel, Ltd*

**TP15(P48) Effects of Heterogeneity of Mn Distribution Evolved during  $\gamma$  Reversion on Bainite Transformation**  
Kaito Matsumoto<sup>1</sup>, Goro Miyamoto<sup>1</sup>, Miku Watanabe<sup>1</sup>, Shunichi Nakayama<sup>2</sup>, Masao Yuga<sup>2</sup>, Tadashi Furuhashi<sup>1</sup>,  
<sup>1</sup> *Tohoku University,* <sup>2</sup> *JFE Steel Corporation*

- TP16(P49) Grain Refinement Mechanism of Prior Austenite during Reversion after Cold Rolling in Medium Mn steel**  
Kotaro Kawahara, Takuro Masumura, Toshihiro Tsuchiyama, *Kyushu University*
- TP17(P50) Development and Application of High Silicon Stainless Steel**  
Takayasu Shimizu, Hiroyuki Shimizu, *Japan Silicolloy Industry Co. Ltd.*
- TP19(P52) Effect of Si Content on Thermal Stability of Austenite in Low Alloyed TRIP Steel - Bainite Transformation Behavior in Austemper of Medium Si Steel**  
Fangyi Wang, Tadachika Chiba, Yoshiyasu Kasasaki, Takako Yamashita, Tatsuya Nakagaito, Shinjiro Kaneko  
*JFE Steel Corporation*
- TP20(P53) Effects of Alloying Elements on Low-temperature Tempering Behaviors of High-carbon Martensite**  
Kento Marusawa<sup>1</sup>, Yonjie Zhang<sup>1</sup>, Goro Miyamoto<sup>1</sup>, Tadashi Furuhashi<sup>1</sup>, Satoshi Morooka<sup>2</sup>  
<sup>1</sup> *Tohoku Univ.*, <sup>2</sup> *Japan Atomic Energy Agency*

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## Thermal Processing of Non-Ferrous Alloys

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- TN09(P54) The Improvement of Quality Index for Sand-casting A357 Al-Si Alloys by External Magnetic Fields via Helmholtz Coils**  
Ing-Song Yu<sup>1</sup>, Shih-Chao Lin<sup>2</sup>  
<sup>1</sup> *National Dong Hwa University*,  
<sup>2</sup> *National Chung-Shan Institute of Science & Technology*
- TN10(P55) Introduction of Millefeuille-like  $\alpha/\beta$  Layered Structure into Ti-Mo Alloy through Thermomechanical Treatment**  
Satoshi Emura, *National Institute for Materials Science*
- TN11(P56) Effects of Heat-Treatment Conditions on Microstructure and Mechanical Properties of Aluminum Alloy with Rare Earth Addition**  
HyoSang Yoo, YongHo Kim, CheolWoo Kim, and HyeonTaek Son  
*Korea Institute of Industrial Technology*
- TN12(P57) Effect of Aging Heat Treatment on Thermal and Electric Conductivity of Al-Zn-Mg-Cu Alloy**  
Youngchan Kim, Seweon Choi, Yumi Kim, Cheolwoo Kim, Changseog Kang  
*Korea Institute of Industrial Technology*
- TN13(P58) Effect of  $\gamma'$  Particle Size on Creep Strength for Ni-Based Superalloy Udimet 520**  
Kenya Ikeda, Yoshihiro Terada, *Tokyo Institute of Technology*

- TN14(P59) Effect of Uniaxial Stress on Microstructure Evolution during Isothermal Aging for Ni-Based Superalloy Alloy 80A**  
*Shunya Sugimura, Yoshihiro Terada, Tokyo Institute of Technology*
- TN15(P60) Microstructural Control of Binary Ti-41Al and Ti-45Al Alloys by Heat Treatment**  
*Kouichi Niinobe<sup>1</sup>, Hiroyuki Kitagawa<sup>2,3</sup>*  
*<sup>1</sup> National Institute of Technology, Matsue College,*  
*<sup>2</sup> Shimane University,*  
*<sup>3</sup> Next generation Tatara Co-Creation Centre (NEXTA)*
- TN16(P61) Effects of Cu Addition and Process Conditions on Mechanical Properties in Multi-layered Al-Zn-Mg Alloys**  
*Katsushi Matsumoto<sup>1</sup>, Masahiro Yamaguchi<sup>1</sup>, Hiroshi Okuda<sup>2</sup>*  
*<sup>1</sup> Kobe Steel, Ltd., <sup>2</sup> Kyoto University*
- TN17(P62) Post-welding Heat Treating Properties of 316L Stainless Steel and 600 Nickel Base Alloy Dissimilar Weldment by GTAW**  
*Chin-Pao Cheng, Yang-Sheng You, Wei-Kang Chiu*  
*National Taiwan Normal University*

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## Thermochemical Treatment

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- TT07(P63) Application of Low Temperature Active-Screen Plasma Nitriding and Carburizing to an Austenitic Stainless Steel Small-Diameter Thin Pipe**  
*Tatsuyuki Aoki<sup>1</sup>, Kenzo Sumiya<sup>1</sup>, Sinkichi Tokuyama<sup>1</sup>,*  
*Junichi Fukui<sup>1</sup>, Atsushi Nishiyama<sup>2</sup>, Akio Nishimoto<sup>3</sup>*  
*<sup>1</sup> Hatta Kogyo Co. Ltd., <sup>2</sup> Mikitec Co., Ltd., <sup>3</sup> Kansai University*
- TT08(P64) Effect of Partial Plasma Nitriding on the Tribological Properties of the AISI H13 Tool Steel**  
*Junji Miyamoto, Daido University*
- TT09(P65) Effect of Oxi-nitrocarburizing on Microstructure and Corrosion Properties of Cast Iron GC250D**  
*MinJae Jeong<sup>1,2</sup>, SeokWon Son<sup>1,3</sup>, Young-Kook Lee<sup>2</sup>, Won-Beom Lee<sup>1</sup>*  
*<sup>1</sup> Korea Institute of Industrial Technology,*  
*<sup>2</sup> Yonsei University, <sup>3</sup>Inha University*
- TT10(P66) Effect of Alloy Elements and Nitriding Conditions on Bending Fatigue Strength in Low C Alloy Steels**  
*Ryota Takao, Aichi Steel*

# Program at a Glance

ver. Oct. 26th, 2023

Date/Time	Room	Front Foyer	303+ Rear Foyer	301+302	304	315	311+312	313+314
Nov. 13 (Mon)	9:00-12:00	-	-	-	-	-	(IFHTSE EC meeting) Lunch	-
	12:00-14:00	-	-	-	-	-	(IFHTSE GC meeting)	-
	14:00-16:00	Registration	-	-	-	-	-	-
	16:00-18:30	-	-	-	-	-	-	-
Nov. 14 (Tue)	17:00-19:00	-	-	-	-	Welcome Party with JSHT 60th Anniversary Awarding Ceremony	-	-
	8:00-8:45	Registration	Corporate Exhibition	Opening Ceremony Awarding Ceremony <i>Coffee break @ 303</i> Plenary Lectures 1, 2	-	-	-	-
	8:45-11:45	-	-	-	-	-	-	-
	11:45-12:45	-	-	Exhibition Introduction & Lunch	-	-	-	-
Nov. 15 (Wed)	8:00-8:45	-	Corporate Exhibition	<i>Keynote 1</i> : Modelling & Simulation <i>Session</i> : Artificial Intelligence & Process Control <i>Keynote 3</i> & <i>Session</i> : Additive Manufacturing	<i>Session</i> : Thermal processing of Steels <i>Coffee break @ 303</i> <i>Session &amp; Keynote 5</i> : Residual Stress & Distortion	<i>Session &amp; Keynote 2</i> : Thermal processing of Non-Ferrous alloy <i>Coffee break</i>	<i>Session</i> : Metallurgy & Properties of Steel & Non-Ferrous Alloy <i>Coffee break</i> <i>Session</i> : Surface Hardening	<i>Session</i> : Coating Technology <i>Coffee break</i> <i>Session</i> : Thermochemical Treatment
	8:45-12:30	Registration	Corporate Exhibition	<i>Session</i> : Metallurgy & Properties of Steel & Non-Ferrous Alloy <i>Coffee break @ 303</i>	<i>Keynote 4</i> & <i>Session</i> : Thermal processing of Steels <i>Coffee break @ 303</i>	<i>Session</i> : Surface Hardening <i>Coffee break</i>	<i>Session &amp; Keynote 6</i> : Shot Peening <i>Coffee break</i> <i>Session</i> : Industrial Equipment	<i>Session</i> : Quenching Technology <i>Coffee break</i> <i>Session</i> : Modelling and Simulation
	12:30-13:30	-	-	Exhibition Introduction & Lunch	-	-	-	-
	13:30-15:00	Poster Session <i>Coffee break</i>	Corporate Exhibition	-	-	-	-	-
Nov. 16 (Thu)	15:00-15:30	-	Corporate Exhibition	Heat Treatment & Surface Engineering Summit	-	-	-	-
	15:30-17:30	-	Corporate Exhibition	-	-	-	-	-
	18:30-20:30	-	-	IFHTSE2023 Congress Banquet with Poster Awarding Ceremony @ InterContinental Yokohama Grand 3rd Floor 5 minutes walk from Conference Center through 2F corridor	-	-	-	-
	8:45-11:55	Registration	Corporate Exhibition	<i>Session</i> : Physical Metallurgy <i>Coffee break</i>	<i>Session</i> : Testing & Characterization <i>Coffee break @ 303</i>	<i>Session</i> : Brazing <i>Coffee break</i>	<i>Session</i> : Artificial Intelligence & Process Control <i>Coffee break</i> <i>Session</i> : Energy Savings & CO <sub>2</sub> Reduction	-
Nov. 17 (Fri)	11:55-12:30	-	-	TBYAA Awarding Ceremony & Closing Session	-	-	-	-
	12:30-13:30	-	-	Lunch	-	-	-	-
	8:45-17:30	-	-	Factory Tour A (Isuzu Motors Fujisawa Plant), B (JFE Steel Eastern Japan Chiba) & Excursion (Kamakura One Day Tour)	-	-	-	-