PROGRAM BOOK

ICAS 2018

6th International Conference on Advanced Steels

November 18-21, 2018

Ramada Plaza Jeju Hotel, Jeju, Korea

Hosted by The Korean Institute of Metals and Materials

Organized by GIFT Graduate Institute of Ferrous Technology, Innovative Process Design Center for Structural Materials

Sponsored by posco, Hyundai Steel, CBMM Niobium, H2C

Supported by KOFST Korean Federation of Science & Technology Societies, Jeju CVB Jeju Convention & Visitors Bureau, Korea Tourism Organization

CONTENTS

WELCOME MESSAGE

Dear Colleagues

On behalf of the Organizing Committee for the 6th International Conference on Advanced Steels, I am pleased to welcome you all to the ICAS 2018 being held November 18-21, 2018 in Jeju, Korea.

As you are probably aware, the ICAS has experienced significant growth over the last 18 years after the 1st ICAS was held in 2002 in Japan. Now the ICAS became one of the foremost international conferences in the fields of advanced steels, affording participants a great opportunity to share and learn about the most recent research results and technological trends.

The Organizing Committee is committed to hosting the scientific must-attend event of 2018, with a broad range of plenary and invited lectures and oral & poster presentations. ICAS 2018 is successfully supported by about 250 papers from steel companies and customers, research institutes and academia of 20 countries. ICAS 2018 opens discussions on latest advances in the alloy design, processing, performance and characterization of advanced steels, and many other relevant topics.

The excellence of this year's program is due to the hard work of the authors and presenters, and members of Organizing Committees. Special thanks should be given to them.

Finally, I sincerely acknowledge the financial contribution of POSCO, Hyundai Steel, CBMM and H2C for the success of ICAS 2018.

I hope all participants have a memorable and productive conference and also enjoy their stay in Jeju.

Sung-Joon Kim

Chairman, Organizing Committee of ICAS 2018
Professor, Graduate Institute of Ferrous Technology, POSTECH

OVERVIEW

about **250** presentations from **21** countries

about **300** participants from **21** countries

about **90** institutions from **21** countries

2018 (6th) Jeju, Korea

2015 (5th) Yokohama, Japan

2010 (4th) Guilin, China

2006 (3th) Gyeongju, Korea

2004 (2nd) Shanghai, China

2002 (1st) Tsukuba, Japan

Title	6th International Conference on Advanced Steels (ICAS 2018)
Date	November 18 (Sun) – 21 (Wed), 2018
Venue	Ramada Plaza Jeju Hotel, Jeju, Korea
Hosted by	The Korean Institute of Metals and Materials
Organized by	Graduate Institute of Ferrous Technology, POSTECH Innovative Process Design Center for Structural Materials
Sponsored by	POSCO, HYUNDAI STEEL, CBMM, H2C
Supported by	The Korean Federation of Science and Technology Societies Jeju Convention & Vistors Bureau Korea Tourism Organization

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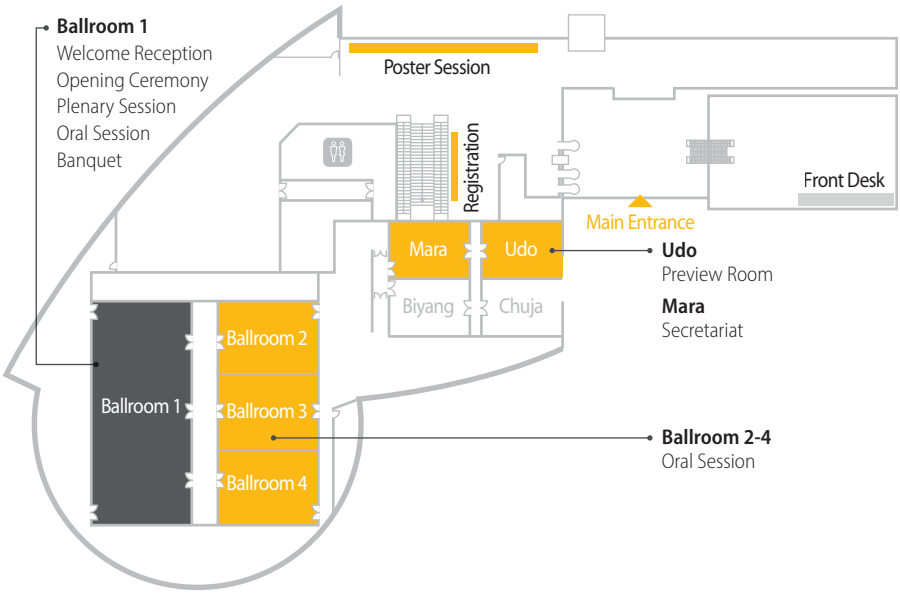
Setsuo Takaki	*Kyushu University*	*Japan*
Jer-Ren Yang	*National Taiwan University*	*Taiwan*
Pei Zhao	*The Chinese Society for Metals*	*China*

PROGRAM AT A GLANCE

	(SUN) November 18	(MON) November 19	(TUE) November 20	(WED) November 21
08:30				
09:00			**Oral Session** 08:30-10:20	**Oral Session** 08:30-10:20
10:00		**Opening Ceremony Plenary Session** 09:30-11:50		
11:00			**Oral Session** 10:40-12:10	**Oral Session** 10:40-12:10
12:00			Lunch	
13:00				
14:00		**Oral Session** 13:10-15:20	**Oral Session** 13:20-15:30	**Oral Session** 13:20-15:10
15:00				
16:00		**Oral Session** 15:40-18:10		
17:00			**Poster Session** 16:00-18:00	
18:00	**Welcome Reception** 18:00-19:30		**Banquet** 18:00-20:00	
19:00				

VENUE LAYOUT



SESSION TIMETABLE

01 **AHSS (DP, TRIP, TWIP, HPF etc)**

02 **HSLA and carbon steels (TMCP, pipelines, bars and wires, etc)**

03 **Special steels (stainless steels, tool steels, heat resistant alloys)**

04 **Coating, corrosion and welding**

05 **Forming and shaping**

06 **Hydrogen embrittlement**

07 **Computational modeling**

08 **Advanced characterization**

(MON) November 19				
	Ballroom 1	Ballroom 2	Ballroom 3	Ballroom 4
09:30-11:50	**Opening Ceremony & Plenary Session**			
11:50-13:10	Lunch			
13:10-15:20	**1-1** AHSS p. 19	**2-1** HSLA and carbon steels p. 20	**3-1** Special steels p. 22	**5-1** Forming and shaping p. 23
15:20-15:40	Coffee Break			
15:40-18:10	**1-2** AHSS p. 19	**2-2** HSLA and carbon steels p. 21	**3-2** Special steels p. 22	**8-1** Advanced characterization p. 24

(TUE) November 20

	Ballroom 1	Ballroom 2	Ballroom 3	Ballroom 4
08:30-10:20	**1-3** AHSS p. 25	**2-3** HSLA and carbon steels p. 26	**7-1** Computational modeling p. 28	**6-1** Hydrogen embrittlemens p. 30
10:20-10:40	Coffee Break			
10:40-12:10	**1-4** AHSS p. 25	**1-6** AHSS p. 27	**7-2** Computational modeling p. 29	**6-2** Hydrogen embrittlemens p. 31
12:10-13:20	Lunch			
13:20-15:30	**1-5** AHSS p. 26	**1-7** AHSS p. 28	**7-3** Computational modeling p. 29	**6-3** Hydrogen embrittlement p. 31
15:30-16:00	Coffee Break			
16:00-18:00	**Poster Session** | Lobby (2F) 1. AHSS (DP, TRIP, TWIP, HPF etc) p. 40 2. HSLA and carbon steels (TMCP, pipelines, bars and wires, etc) p. 41 3. Special steels (stainless steels, tool steels, heat resistant alloys) p. 43 4. Coating, corrosion and welding p. 45 5. Forming and shaping p. 47 6. Hydrogen embrittlement p. 47 7. Computational modeling p. 48 8. Advanced characterization p. 49			
18:00-20:00	**Banquet** | Ballroom 1 (2F)			

(WED) November 21

	Ballroom 1	Ballroom 2	Ballroom 3	Ballroom 4
08:30-10:20	**1-8** AHSS p. 33	**1-11** AHSS p. 34	**4-1** Coating, corrosion and welding p. 36	**6-4** Hydrogen embrittlement p. 38
10:20-10:40	Coffee Break			
10:40-12:10	**1-9** AHSS p. 33	**3-3** Special steels p. 35	**4-2** Coating, corrosion and welding p. 37	**8-2** Advanced characterization p. 38
12:10-13:20	Lunch			
13:20-15:10	**1-10** AHSS p. 34	**3-4** Special steels p. 35	**4-3** Coating, corrosion and welding p. 37	**5-2** Forming and shaping p. 39

PLENARY

Chul Min Bae

POSCO Technical Research Laboratories, Korea

Eco-Friendly Steel Products for the Future Industry

(MON) Nov. 19, 09:50-10:30
Ballroom 1

Kaneaki Tsuzaki

Kyushu University, Japan

A New Challenge to Hydrogen-induced Mechanical Degradation in High Strength Steels

(MON) Nov. 19, 10:30-11:10
Ballroom 1

Yuqing Weng

The Chinese Society for Metals, China

The Recent Progress of Advanced Structural Steels in China

(MON) Nov. 19, 11:10-11:50
Ballroom 1

INVITED

Yoshitaka Adachi

Nagoya University, Japan

Materials Backcasting -Two AI-Material Genome Integration Systems for Phase and Property Analysis-

(TUE) Nov. 20, 10:40-11:10
Ballroom 3

Harshad K. D. H. Bhadeshia

Cambridge University, UK

Difficulties in the Theory of Ferrite Growth Kinetics - The Problem of Sharp Concentration Gradients

(TUE) Nov. 20, 13:20-13:50
Ballroom 3

Jian Bian

Niobium Tech Asia, Singapore

Development of High Strength Steels with High Resistance to Hydrogen Induced Delayed Cracking through Microstructure Engineering

(TUE) Nov. 20, 10:40-11:10
Ballroom 4

Wolfgang Bleck

RWTH Aachen University, Germany

Strength and Ductility of High Manganese Sheet Steels

(MON) Nov. 19, 15:40-16:10
Ballroom 1

Guocai Chai

Sandvik Materials Technology, Sweden

Recently Developed Advanced Stainless Steels with High Performance

(MON) Nov. 19, 13:10-13:40
Ballroom 3

Tiago Carneiro da Costa

Companhia Brasileira de Metalurgia e Mineração, Brazil

Niobium Applied Technology in Future Mobility

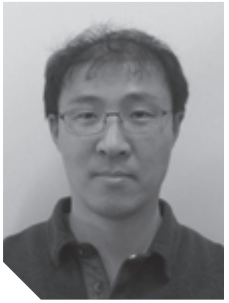
(TUE) Nov. 20, 10:40-11:10
Ballroom 2

Tadashi Furuhara

Tohoku University, Japan

Carbon Partitioning during Ferrite and Bainite Transformations in Low-Alloy Steels

(TUE) Nov. 20, 10:40-11:10
Ballroom 1



Nam Hoon Goo

Hyundai Steel, Korea

Influence of Microstructure on the Hole Expansion Property in the Medium Manganese Steel

(WED) Nov. 21, 08:30-09:00
Ballroom 1

Heung Nam Han

Seoul National University, Korea

Aging Effect on Mechanical Behavior of High-Mn Low-Density Steels

(WED) Nov. 21, 10:40-11:10
Ballroom 2

Hyun Uk Hong

Changwon National University, Korea

Grain Refinement Achieved by Hetero-Epitaxial Nucleation during Rapid Solidification in a Newly Developed Ferritic Stainless Steel for High Formability

(WED) Nov. 21, 13:20-13:50
Ballroom 2

Mingxin Huang

The University of Hong Kong, China

Ultrahigh Strength Deformed and Partitioned (D&P) Steel Achieved by Dislocation Engineering

(WED) Nov. 21, 08:30-09:00
Ballroom 2

Christopher Hutchinson

Monash University, Australia

Cementite Coarsening during the Tempering of Fe-C-Mn Martensite

(TUE) Nov. 20, 08:30-09:00
Ballroom 1

Namhyun Kang

Pusan National University, Korea

Formation Behavior of δ Ferrite and Pitting Behavior within LB and GTA Weld Zone of Mod. 9Cr-1Mo Steel in Terms of Thermal History

(WED) Nov. 21, 13:20-13:50
Ballroom 3

Suk-Kyu Lee

POSCO, Korea

Study on Internal Oxidation Behavior of Si-added TRIP Steel

(WED) Nov. 21, 08:30-09:00
Ballroom 3

Tae-Ho Lee

Korea Institute of Materials Science, Korea

A Model for Strain-Induced FCC-HCP-BCC Martensitic Transformation

(MON) Nov. 19, 15:40-16:10
Ballroom 3

Young-Kook Lee

Yonsei University, Korea

Tensile Properties of Tempered-Martensitic Medium Mn Lightweight Steel

(WED) Nov. 21, 13:20-13:50
Ballroom 1

Dayong Li

Shanghai Jiao Tong University, China

Recent Progress on Chain-Die Forming of AHSS

(MON) Nov. 19, 13:10-13:40
Ballroom 4

Matthias Militzer

The University of British Columbia, Canada

Computational Modelling of Phase Transformations in Advanced Steels

(TUE) Nov. 20, 08:30-09:00
Ballroom 3

Emmanuel De Moor

Colorado School of Mines, USA

Effect of Silicon on Tempering of Martensite and Bainite

(TUE) Nov. 20, 08:30-09:00
Ballroom 2

Takahito Ohmura

National Institute for Materials Science, Japan

Collective Motion of Dislocation Associated with Local Plasticity Initiation and Subsequent Behavior in BCC Metals

(WED) Nov. 21, 10:40-11:10
Ballroom 4

Yeong-Do Park

Dong-Eui University, Korea

Various Types of Liquid Metal Embrittlement Cracking in Resistance Spot Welding of Zn Coated Advanced High Strength Steels

(WED) Nov. 21, 10:40-11:10
Ballroom 3

Elena V. Pereloma

University of Wollongong, Australia

Application of Advanced Characterisation Techniques to Elucidate Strengthening Mechanisms in Mo, Nb and V Microalloyed Steels

(MON) Nov. 19, 15:40-16:10
Ballroom 2

Dirk Ponge

Max-Planck-Institut für Eisenforschung GmbH, Germany

Physical Metallurgy of Segregation and Its Impact on Embrittlement and Austenite Reversion in Medium Mn Steels

(TUE) Nov. 20, 13:20-13:50
Ballroom 2

Chengjia Shang

University of Science and Technology Beijing, China

Investigation on the Weldability of High Performance Plate Steels

(MON) Nov. 19, 13:10-13:40
Ballroom 2

John Speer

Colorado School of Mines, USA

Quenching and Partitioning of Plate Steels

(MON) Nov. 19, 16:10-16:40
Ballroom 2

Dong-Woo Suh

Pohang University of Science and Technology, Korea

Hydrogen Permeation in High Mn Austenitic Steels

(WED) Nov. 21, 08:30-09:00
Ballroom 4

Jin-Yoo Suh

Korea University, Korea

Stacking Fault Energy Measurement of CrMnFeCoNi High Entropy Alloy Studied by Transmission Electron Microscopy

(TUE) Nov. 20, 13:20-13:50
Ballroom 4

Setsuo Takaki

Kyushu University, Japan

Effect of Grain Size on the Yielding and Post-Yield Deformation in Ferritic Steel

(MON) Nov. 19, 13:10-13:40
Ballroom 1

Cem Tasan

Massachusetts Institute of Technology, USA

Micrometer-scale Dislocation Motion in Apparently Stress-free Samples: An Unexpected Hydrogen Effect

(TUE) Nov. 20, 08:30-09:00
Ballroom 4

Toshihiro Tsuchiyama

Kyushu University, Japan

Discussion on Hall-Petch Coefficient of Ferritic Steel Based on Experimentally Measured Critical Grain Boundary Shear Stress

(WED) Nov. 21, 10:40-11:10
Ballroom 1

Nobuhiro Tsuji

Kyoto University, Japan

Reason for High Strength and Good Ductility in Dual Phase Steels

(TUE) Nov. 20, 13:50-14:20
Ballroom 1

Murali Tumuluru

U.S Steel, USA

Weldability of Automotive Sheet Steels Beyond Generation 1 Advanced High Strength Steels

(WED) Nov. 21, 09:00-09:30
Ballroom 3

Jer-Ren Yang

National Taiwan University, Taiwan

TEM Investigation of Severe Deformation Structures of Nanostructured Bainitic Steel

(TUE) Nov. 20, 13:20-13:50
Ballroom 1

REGISTRATION

REGISTRATION DESK

Lobby (2F)

- SUN November 18, 16:00-18:30
- MON November 19, 08:00-18:30
- TUE November 20, 08:00-18:30
- WED November 21, 08:00-15:30

On-site Registration Fee

Regular	USD 900 | KRW 990,000
Student	USD 500 | KRW 550,000
Accompanying Person	USD 200 | KRW 220,000

Fee Includes

Regular / Student	Admission to all sessions, Conference Kit, Lunches, Reception, Banquet
Accompanying Person	Lunches, Reception, Banquet

Name Badge

Wearing the badge is required for admission to all areas.

Receipt & Certifcate

A registration receipt and a certifcate of attendance are provided.

Program Book

Useful information of ICAS 2018

Proceedings

Printed papers of ICAS 2018

Souvenirs

- Eco Bag
- Pen
- Note

HOTEL & TOUR DESK

Lobby (2F)

- SUN November 18, 16:00-18:00
- MON November 19, 09:00-18:00
- TUE November 20, 09:00-18:00
- WED November 21, 09:00-12:00

	Hotel	Distance from Venue
01	Ramada Plaza Jeju Hotel	Conference Venue
02	Jeju Oriental Hotel	5 minutes walking distance (0.3km)
03	Jeju Ocean Suites	10 minutes walking distance (0.6km)
04	Hotel Regent Marine The Blue	12 minutes walking distance (0.7km)
05	Whistle Lark	12 minutes walking distance (0.7km)

USEFUL TIPS

LUNCH

MON	November 19	11:50-13:10
TUE	November 20	12:10-13:20
WED	November 21	12:10-13:20

Restaurant (1F)

COFFEE

Fresh coffee and tea will be served during the break times.

MON	November 19	15:20-15:40
TUE	November 20	10:20-10:40 & 15:30-16:00
WED	November 21	10:20-10:40

Lobby (2F)

DOUGHNUT TIME

Doughnut & coffee will be provided every morning.

MON	November 19	09:00-09:20
TUE-WED	November 20-21	08:00-08:20

Lobby (2F)

PARKING

Parking is available at no cost during the conference.

PREVIEW ROOM

Internet and printing service are available.

SUN	November 18	16:00-18:00
MON	November 19	08:00-18:00
TUE	November 20	08:00-18:00
WED	November 21	08:00-15:00

Udo (2F)

MESSAGE BOARD

Message board will be set up at the lobby (2F) so that participants can get useful information.

MOBILE CHARGE

Mobile device charging is available at the registration desk (2F).

WI-FI ACCESS

RAMADA or RAMADA_PAD

SECRETARIAT

SUN	November 18	14:00-18:30
MON	November 19	08:00-18:30
TUE	November 20	08:00-18:30
WED	November 21	08:00-15:30

Mara (2F)

SOCIAL PROGRAMS

WELCOME RECEPTION

Date & Time (SUN) November 18, 18:00-19:30
Place Ballroom 1 (2F)
Menu International Buffet

The welcome reception will be an excellent chance to make new friends and expand partnerships while enjoying a quality standing buffet. Come and join this entertaining icebreaker of ICAS 2018.

OPENING CEREMONY

Date & Time (MON) November 19, 09:30-09:50
Place Ballroom 1 (2F)

The opening ceremony will mark the official beginning of conference and all participants are cordially invited. Be a part of the official opening celebration.

- Opening Address by ICAS 2018 Chairman
- Welcoming Addresses by KIM President

BANQUET

Date & Time (TUE) November 20, 18:00-20:00
Place Ballroom 1 (2F)
Menu Korean Set Course

The banquet will be a great opportunity to meet and network with colleagues in pleasant surroundings. Enjoy the climax of ICAS 2018 with an excellent dinner.

Sponsored by KOREA TOURISM ORGANIZATION

- Congratulatory Addresses
- Poster Awards
- Celebration Performance
- ICAS 2018 Report
- O/X Quiz
- Group Photo

POSTER AWARD

"ICAS 2018 Best Poster Awards" will be given to outstanding contributions to the field of advanced steels among the posters presented at the conference. The Awardees will be announced at the banquet. You may be one of the winners of the ICAS 2018 Best Poster Awards!

Prize KRW 100,000

PRESENTATION GUIDELINES

ORAL SESSION

1. Presentation Time

- Length of presentation material should be in accordance with your time assigned as follows;

Type	Presentation Time
Invited Presentation	30 min presentation including Q&A
Oral Presentation	20 min presentation including Q&A

- Due time is strongly encouraged.
- Presentation material is to be concise, succinct, and clearly understood.

2. Presentation File & Speaker's Biography

- If you use fonts other than standard Windows Office 2016, please bring the font files along with the presentation file.
- Please bring your PowerPoint presentation file on USB memory stick and submit it to the staff of each presentation room at least 15 minutes before each session starts. The operator will load the presentation files to the laptop PC.
- Each presenter (except invited speaker) is also asked to submit his/her own short biography to the session chair at least 10 minutes before each session starts.

3. Preview Room

Operation Hours			Place
SUN	November 18	16:00-18:00	Udo (2F)
MON-TUE	November 19-20	08:00-18:00	
WED	November 21	08:00-15:00	

- Please visit the preview room to check your presentation file at least 3 hours before your session starts to ensure your presentation file appears properly.
- If your presentation file contains animations or movies, you are advised to check over the technical matters 6 hours prior to your session.

4. No Camera & No Record

- Please note that photo taking and video recording are strictly prohibited in the presentation room.

POSTER SESSION

Presentation Day	Set-up	Presentation	Tear-Down	Place
TUE November 20	30 minutes prior to the beginning of the session	16:00-18:00	~ 21:00	Lobby (2F)

- Each poster will be assigned a panel, which has its own paper's number at the conference.
- We do not specify the poster format, but each poster should include the paper title, authors, and affiliation and must fit within a 0.9m x 1.2m space.
- The poster text including the paper title should be printed and enlarged, so that it can be read from a distance of at least 2 meters.
- Poster presenters are required to prepare their own poster materials in advance.
- The materials such as some scissors and tapes will be provided in poster session place.

1-1. AHSS (DP, TRIP, TWIP, HPF etc)

November 19 (Mon) *Ballroom 1 (2F)*

Chair Toshihiro Tsuchiyama (Kyushu University, Japan)

1-0255 Effect of Grain Size on the Yielding and Post-Yield Deformation in Ferritic Steel
13:10-13:40 Setsuo Takaki
INVITED *Kyushu University, Japan*

1-0713 Luders Band and Its Correlation with Martensitic Transformation in a Medium Mn TRIP Steel
13:40-14:00 X.G. Wang[1], C.H. Liu[1], C. Jiang[1], M.X. Huang[2]
[1]Hunan University, China, [2]The University of Hong Kong, China

1-0361 Yielding and Work Hardening Behaviors of α+γ and α'+γ Lamellar Structures in an Fe-10Mn-3Al-0.2C Based Alloy
14:00-14:20 Yoon-Uk Heo, Dong-Hwi Kim, Nam-Hoe Heo, Sung–Joon Kim
Pohang University of Science and Technology, Korea

1-0319 Mechanical Properties of Al-Added High-Mn Austenitic Steels with Various Grain Sizes
14:20-14:40 Yu Bai, Takumi Nakata, Sukyoung Hwang, Nobuhiro Tsuji
Kyoto University, Japan

1-0805 Effects of Pre-Strain and Aging Process on the Microstructure and Bake-hardening Behavior of 1000 MPa Cold Rolled Dual-phase Steel
14:40-15:00 Chunfu Kuang, Zhiwang Zheng
Research Institute of Pangang Group, China

1-0628 Nanoindentation Behavior of Individual Austenite Grain in Steels
15:00-15:20 Tinghui Man[1], Takahito Ohmura[1, 2], Yo Tomota[2]
[1]Kyushu University, Japan, [2]National Institute for Materials Science, Japan

1-2. AHSS (DP, TRIP, TWIP, HPF etc)

November 19 (Mon) *Ballroom 1 (2F)*

Chair Dong-Woo Suh (Pohang University of Science and Technology, Korea)

1-0283 Strength and Ductility of High Manganese Sheet Steels
15:40-16:10 Wolfgang Bleck, Xiaofei Guo, Manjunatha Madivala, Wenwen Song
INVITED *RWTH Aachen University, Germany*

1-0925 Factors Affecting Fatigue Behavior of High-Mn Steels
16:10-16:30 Sangshik Kim
Gyeongsang National University, Korea

1-0702 Development of High Mn Steel Metallurgy for Slurry Pipeline Applications
16:30-16:50 H.W. Jin[1], N. Ma[1], A. Wasson[2], D. Fairchild[3], Y. Kim[4], S. Lee[4], S.K. Kim[4], I.S. Suh[4]
[1]ExxonMobil Research & Engineering Company, USA, [2]ExxonMobil Upstream Research Company, USA, [3]ExxonMobil Upstream Engineering, USA, [4]POSCO, Korea

1-0614 Mechanical Behavior of TWIP/TRIP Austenitic Steels with Warm or Hot Worked Microstructures
16:50-17:10 Andrey Belyakov, Vladimir Torganchuk, Rustam Kaibyshev
Belgorod State University, Russia

1-0912 Orientation-Dependent Deformation Mechanisms and the Role of Interfaces in Face-centered Cubic Fe-Mn-C TWIP Steel Micro-pillars
17:10-17:30 Won Seok Choi[1, 2], Stefanie Sandlöbes[2, 3], Nataliya V. Malyar[2], Christoph Kirchlechner[2], Sandra Korte-Kerzel[3], Gerhard Dehm[2], Bruno C. De Cooman[4], Dierk Raabe[2]
[1]Korea Advanced Institute of Science and Technology, Korea, [2]Max-Planck-Institut für Eisenforschung GmbH, Germany, [3]RWTH Aachen University, Germany [4]NLMK, Russia

1-0489 Dynamic Strain Aging Mechanism for Serrations in the Tensile Curve of C-Bearing TWIP Steel
17:30-17:50 Seon-Keun Oh, Young-Kook Lee
Yonsei University, Korea

1-0859 Experimental Study on the Solidification Structure of High Mn & Al Steel
17:50-18:10 Xiao-lei Zhu, Xiang-wei Liao, Shuang Wang
Ansteel Co., Ltd., China

2-1. HSLA and carbon steels (TMCP, pipelines, bars and wires, etc)

November 19 (Mon) *Ballroom 2 (2F)*

Chair Byoungchul Hwang (Seoul National University of Science and Technology, Korea)

2-0698 Investigation on the Weldability of High Performance Plate Steels
13:10-13:40 Chengjia Shang[1, 2]
INVITED *[1]University of Science and Technology Beijing, China, [2]State Key Laboratory of Metal Materials for Marine Equipment and Applications, China*

2-0353 A 1.8 GPa Press-hardening Steel with 16% Elongation Achieved by Bake Partitioning
13:40-14:00 Z. R. Hou[1], P. J. Du[1], X. C. Xiong[2], H. L. Yi[1, 2]
[1]Northeastern University, China, [2]Easyforming Materials Technology Co., Ltd., China

2-0712 Investigation on Fracture Toughness of Coarse Grained Heat Affected Zone (CGHAZ) from the Aspect of Crystallographic Variants
14:00-14:20 Xuelin Wang[1], Zhiquan Wang[1], S.V. Subramanian[2], Chengjia Shang[1, 3]
[1]University of Science and Technology Beijing, China, [2]McMaster University, Canada, [3]State Key Laboratory of Metal Materials for Marine Equipment and Applications, China

2-0676 Effect of the Structural Inhomogeneity on Mechanical Response of Microalloyed Steels
14:20-14:40 Marcin Kwiecień, Remigiusz Bloniarz, Paulina Lisiecka-Graca, Janusz Majta
AGH University of Science and Technology, Poland

2-0208 14:40-15:00 The CGHAZ Toughness Evaluation of Newly Developed N-Controlled Fire and Seismic Resistant Steel
Dileep Chandran Ramachandran, Siva Prasad Murugan, Ji-Ung Kim, Yeong-Do Park
Dong-Eui University, Korea

2-0624 15:00-15:20 Development of Shipping Cask Shell Material Manufacturing with Improved Low Temperature Toughness
Kukcheol Kim, Byoungkoo Kim, Jaesuk Jeong, Jaewoong Lee, Jhinik Suk
Doosan Heavy Industries & Construction, Korea

2-2. HSLA and carbon steels (TMCP, pipelines, bars and wires, etc)

November 19 (Mon) *Ballroom 2 (2F)*

Chair Emmanuel De Moor (Colorado School of Mines, USA)

2-0366 15:40-16:10 INVITED Application of Advanced Characterisation Techniques to Elucidate Strengthening Mechanisms in Mo, Nb and V Microalloyed Steels
Navjeet Singh, Gilberto Casillas, Elena V. Pereloma
University of Wollongong, Australia

2-0708 16:10-16:40 INVITED Quenching and Partitioning of Plate Steels
John Speer, Rachael Stewart, Brian Thomas, Amy Clarke, Emmanuel De Moor
Colorado School of Mines, USA

2-0815 16:40-17:00 Focus on the Precipitation Behavior in the Modern DP Steel
Chih-Yuan Chen[1], Cheng-Han Li[2], Shao-Pu Tsai[2], Jer-Ren Yang[2]
[1]National Taipei University of Technology, Taiwan, [2]National Taiwan University, Taiwan

2-0270 17:00-17:20 A Rationale for the Tough Ultrahigh-Strength Steels through Direct Quenching and Partitioning
Mahesh Somani[1], David Porter[1], Devesh Misra[2], Pekka Kantanen[1], Jukka Kömi[1]
[1]University of Oulu, Finland, [2]University of Texas at El Paso, USA

2-0623 17:20-17:40 Formation of Inhomogeneous Coarse Pearlite/Bainite Structure after Hot Forging with Small Deformation in SCM420 Steel
Takeshi Miyazaki[1], Goro Miyamoto[2], Tadashi Furuhara[2]
[1]Sanyo Special Steel Co., Ltd., Japan, [2]Tohoku University, Japan

2-0163 17:40-18:00 Effect of Microstructure and Strain Aging on the Deformability of High-Strength API Pipeline Steels
Sang-In Lee[1], Hwan-Gyo Jung[2], Byoungchul Hwang[1]
[1]Seoul National University of Science and Technology, Korea, [2]POSCO, Korea

3-1. Special steels (stainless steels, tool steels, heat resistant alloys)

November 19 (Mon) *Ballroom 3 (2F)*

Chair Tae-Ho Lee (Korea Institute of Materials Science, Korea)

3-0872 13:10-13:40 INVITED
Recently Developed Advanced Stainless Steels with High Performance
Guocai Chai[1, 2]
[1]Sandvik Materials Technology, Sweden, [2]Linköping University, Sweden

3-0774 13:40-14:00
Role of Grain Boundary for the High Temperature Oxidation Behavior of 22wt% Cr Containing Ferritic Stainless Steel
Byung Kyu Kim[1, 2], Dong-Ik Kim[1], Kyung-Woo Yi[2]
[1]Korea Institute of Science and Technology, Korea, [2]Seoul National University, Korea

3-0244 14:00-14:20
Development of Non-Coated Stainless Steel Bipolar Plate for PEMFC at POSCO
KwangMin Kim, JongHee Kim
POSCO, Korea

3-0542 14:20-14:40
Development of a Novel TRIP-Aided Lean Duplex Stainless Steel by Twin-Roll Strip Casting and Its Deformation and Corrosion Behaviors
Yan Zhao, Zhenyu Liu
Northeastern University, China

3-0528 14:40-15:00
Development of Corrosion-Resistant Lightweight Steels
Jae Suk Jeong[1], Jinik Suk[1], Jonho Shin[1], Yu-Il Choi[1], Seong-Jun Park[2]
[1]Doosan Heavy Industries & Construction, Korea, [2]Korea Institute of Materials Science, Korea

3-0126 15:00-15:20
Microstructure, Mechanical Properties and Oxidation Properties of Ultrafine-Grained 9Cr2WVTa Ferritic/Martensitic Steel
Shenghu Chen, Lijian Rong
Institute of Metal Research, Chinese Academy of Sciences, China

3-2. Special steels (stainless steels, tool steels, heat resistant alloys)

November 19 (Mon) *Ballroom 3 (2F)*

Chair Guocai Chai (Sandvik AB, SMT, Sweden)

3-0510 15:40-16:10 INVITED
A Model for Strain-Induced FCC-HCP-BCC Martensitic Transformation
Tae-Ho Lee[1], Heon-Young Ha[1], Jae Hoon Jang[1], Joonoh Moon[1], Sung-Dae Kim[1], Jong-Ho Shin[2], Jong-Wook Lee[2]
[1]Korea Institute of Materials Science, Korea, [2]Doosan Heavy Industries and Construction Co., Ltd., Korea

3-0946 16:10-16:30
The Effect of Magnetic Field on Carbides and Dislocation Density after Tempering of High Chromium-Containing Steel
Guanghui Wu, Tingping Hou, Kaiming Wu
Wuhan University of Science and Technology, China

3-0189 16:30-16:50
Effect of Tensile Stresses on the Partitioning of Carbon during Quenching and Partitioning (Q&P) of Stainless Steels
Qiuliang Huang, Xian Feng, Javad Mola
Technische Universität Bergakademie Freiberg, Germany

3-0372 16:50-17:10
Effects of Carbon and Nitrogen on Thermal Stability of Metastable Austenitic Stainless Steel
Takuro Masumura[1], Toshihiro Tsuchiyama[1], Setsuo Takaki[1], Tamotsu Koyano[2]
[1]Kyushu University, Japan, [2]University of Tsukuba, Japan

3-0258 17:10-17:30
Effect of Precipitate Evolution on Creep Properties of 2.25Cr-1Mo Steel
Dong-Ju Chu[1, 2], Han-Yeol Kim[1, 2], Joonho Lee[1], Woo-Sang Jung[2]
[1]Korea University, Korea, [2]Korea Institute of Science and Technology, Korea

3-0388 17:30-17:50
Effect of Precipitates Evaluation on Creep Properties in T91/T92 Seamless Tubes
Han-Yeol Kim[1, 2], Joo-Youl Huh[2], Woosang Jung[2]
[1]Korea University, Korea, [2]Korea Institute of Science and Technology, Korea

3-0213 17:50-18:10
Effect of Bainite Isothermal Time on Microstructure and Hardness of a High-Carbon Chromium-Containing Steel with Aluminum Addition
Su-huai Deng, Yue Ma, Hui-feng Zhang, Nai-bing Lv
Shougang Group Co., Ltd., China

5-1. Forming and shaping

November 19 (Mon) *Ballroom 4 (2F)*

Chair Myoung-Gyu Lee (Seoul National University, Korea)

5-0211 13:10-13:40 INVITED
Recent Progress on Chain-Die Forming of AHSS
H. Yang[1], Z.Y. Liang[1], Y.G. Li[1], Z.H. Zhang[1], D.Y. Li[1], S.C. Ding[2], L. Shi[3], H. Xiao[3]
[1]Shanghai Jiao Tong University, China, [2]The University of Queensland, Australia, [3]Baoshan Iron & Steel Co., Ltd, China

5-0822 13:40-14:00
Evaluation of Forming Limits of DP590 Steel Based Sound-deadening Laminate Sheet
Hyeonil Park[1, 2], Se-Jong Kim[1], Jinwoo Lee[1], Daeyong Kim[1]
[1]Korea Institute of Materials Science, Korea, [2]Pusan National University, Korea

5-0884 14:00-14:20
Analysis of Mechanical Deformation Behavior of Advanced High Strength Steel by Using the Finite Element Method in Conjunction with the Unified Mechanical Properties
Seung Chae Yoon, Ji Young Kim, Je Yeul Kong, Young Chel Park, Ki Hak Im, Byung Yeul Min
Hyundai Steel R&D Center, Korea

5-0894 14:20-14:40
Hole Expansion Behavior of Multiphase Hot-Rolled Advanced High Strength Steels Sheets
Samaneh Alibeigi, Sujay Sarkar, Jorge Goncalves, Blandine Oehler
ArcelorMittal Maizières-Lès-Metz, France

5-0560 14:40-15:00
A Dislocation-Density Based Crystal Plasticity Model to Predict Mechanical Behaivor of Steels under Non-Proportional Strain Paths
Hyuk Jong Bong[1], Jinwoo Lee[1], Myoung-Gyu Lee[2]
[1]Korea Institute of Materials Science, Korea, [2]Seoul National University, Korea

5-0423 15:00-15:20
Prediction of Mechanical Properties after Pipe Forming of API Steels Using FEM and Data Mining
Jin-Ho Bae[1], Soo-Chang Kang[2], Chang Sun Lee[3]
[1]POSCO Technical Research Laboratories, Korea, [2]Steel Structure Research Group, Korea, [3]DA Consult, Korea

8-1. Advanced characterization

November 19 (Mon) *Ballroom 4 (2F)*

Chair Goro Miyamoto (Tohoku University, Japan)

8-0609 15:40-16:00
In-House Small-Angle X-ray and Neutron Scattering for Quantitative Characterization of Nano-Size Precipitates in Steel
Masato Ohnuma, Toshinori Ishida, Michihiro Furusaka
Hokkaido University, Japan

8-0305 16:00-16:20
Visualization and Quantification of Constituent Phases in a TRIP-assisted Duplex Stainless Steel Using Energy Selective Neutron Imaging
Wanchuck Woo[1], Jongyul Kim[1], Eun-Young Kim[2], Shi-Hoon Choi[2], Daniel S. Hussey[3]
[1]Korea Atomic Energy Research Institute, Korea, [2]Sunchon National University, Korea, [3]National Institute of Standards and Technology, USA

8-0828 16:20-16:40
Development of an Analytical STEM Applying a Superconductor Detector as an EDS for Precise Nano-Analysis of Advanced Steels
Toru Hara
National Institute for Materials Science, Japan

8-0430 16:40-17:00
Fabrication and Characterization of Nanocrystalline Fe-Mn Alloy by Powder Metallurgy
Seung-Jin Oh, Seok-Jae Lee
Chonbuk National University, Korea

8-0438 17:00-17:20
Mechanical and Corrosion Characteristics on Different Heat Affected Zone in Ni- and Mo- Leanized Duplex Stainless Steels
Youngchai Lee[1], Chang Min Lee[1], Tae-Ho Lee[2], Changhee Lee[1]
[1]Hanyang University, Korea, [2]Korea Institute of Materials Science, Korea

1-3. AHSS (DP, TRIP, TWIP, HPF etc)

November 20 (Tue) *Ballroom 1 (2F)*

Chair Tadashi Furuhara (Tohoku University, Japan)

1-0455 **Cementite Coarsening during the Tempering of Fe-C-Mn Martensite**
08:30-09:00 Yuxiang Wu[1], Wenwen Sun[1], Mark Styles[2], Artem Arlazarov[3], Christopher Hutchinson[1]
INVITED *[1]Monash University, Australia, [2]CSIRO Manufacturing, Australia, [3]Maizières-les-Metz, France*

1-0498 **Difference in Thermodynamics between Ferrite and Martensite in Fe-Ni Alloy**
09:00-09:20 Nobuo Nakada[1], Naoki Kusunoki[2], Masanori Kajihara[1], Junichi Hamada[3]
[1]Tokyo Institute of Technology, Japan, [2]Hino Motors, Ltd., Japan, [3]Nippon Steel & Sumikin Stainless Steel, Japan

1-0584 **Thermo-Kinetic Design of Metastable Retained Austenite in Advanced High Strength Steels**
09:20-09:40 Zongbiao Dai, Ran Ding, Chi Zhang, Zhigang Yang, Hao Chen
Tsinghua University, China

1-0727 **Heterogeneous Microstructure in Quenching and Partitioning Steels: Experiments and Modeling**
09:40-10:00 Ran Ding, Yang Zhigang, Chi Zhang, Hao Chen
Tsinghua University, China

1-0591 **Stabilizing Austenite via a Core-Shell Structure in the Medium Mn Steel**
10:00-10:20 Xinhao Wan, Yang Zhigang, Chi Zhang, Hao Chen
Tsinghua University, China

1-4. AHSS (DP, TRIP, TWIP, HPF etc)

November 20 (Tue) *Ballroom 1 (2F)*

Chair Nobuhiro Tsuji (Kyoto University, Japan)

1-0185 **Carbon Partitioning during Ferrite and Bainite Transformations in Low-Alloy Steels**
10:40-11:10 Tadashi Furuhara, Goro Miyamoto
INVITED *Tohoku University, Japan*

1-0765 **On the Non-Equilibrium Microstructure and Mechanical Behavior of the Fast- heating Q&P Steels**
11:10-11:30 Geng Liu, Hao Chen
Tsinghua University, China

1-0642 **Experimental Study and Modelling of Bainitic Transformation and the Effect on Stability of Retained Austenite in Low Carbon High Silicon Steel during Isothermal Holding**
11:30-11:50 Z.J. Xie, C.J. Shang, Z.F. Liu
University of Science and Technology Beijing, China

1-0507 A Novel Processing Route of TMCP Technology in Combination with Dynamic Partitioning for Hot Rolled Q&P Steel Production
11:50-12:10
Yunjie Li, Jian Kang, Guo Yuan, Hesong Wang, Guodong Wang
Northeastern University, China

1-5. AHSS (DP, TRIP, TWIP, HPF etc)

November 20 (Tue) *Ballroom 1 (2F)*

Chair Mingxin Huang (The University of Hong Kong, Hong Kong)

1-0573 TEM Investigation of Severe Deformation Structures of Nanostructured Bainitic Steel
13:20-13:50
Jer-Ren Yang[1], Y. T. Tsai[1], C. R. Lin[2], W. S. Lee[2], C. Y. Huang[3]
INVITED
[1]National Taiwan University, Taiwan, [2]National Cheng Kung University, Taiwan, [3]China Steel Corporation, Taiwan

1-0428 Reason for High Strength and Good Ductility in Dual Phase Steels
13:50-14:20
Myeong-heom Park, Nobuhiro Tsuji
INVITED
Kyoto University, Japan

1-0845 Analysis of Excellent Mechanical Properties of 0.1%C-2%Si-5%Mn Ultrafine Fresh Martensite Steel and Ferrite+Austenite Steel by Synchrotronradiation
14:20-14:40
Shiro Torizuka, Hiroki Adachi, Akihiro Maeda, Takanobu Adachi
University of Hyogo, Japan

1-0677 Tunable Microstructure and Mechanical Properties in Hot-rolled TRIP/DP Steels
14:40-15:00
Shih Che Chen[1], Yuan Tsung Wang[2], Hung-Wei Yen[1]
[1]National Taiwan University, Taiwan, [2]China Steel Corporation, Taiwan

1-0220 A New Approach to Improve Strength-ductility Balance of Ultra-high Strength Steel Sheet
15:00-15:20
Yuta Matsumura[1], Yoshihiro Hosoya[1], Yo Tomota[2], Yusuke Onuki[3]
[1]Tokushu Kinzoku Excel, Japan, [2]National Institute for Materials Science, Japan, [3]Ibaraki University, Japan

1-1000 High Performance Steel: Initiative and Practice
15:20-15:40
Dong Han
Shanghai University, China

2-3. HSLA and carbon steels (TMCP, pipelines, bars and wires, etc)

November 20 (Tue) *Ballroom 2 (2F)*

Chair Chengjia Shang (University of Science and Technology Beijing, China)

2-0764 Effect of Silicon on Tempering of Martensite and Bainite
08:30-09:00
Emmanuel De Moor[1], Igor Vieira[1, 2], John G. Speer[1]
INVITED
[1]Colorado School of Mines, USA, [2]Nucor Steel, Sheet Mill Group, USA

2-0233 Fracture Mode Change Using Shear Lip by Separation in X-70 Grade Line-Pipe Steel
09:00-09:20 Wung Yong Choo[1], Yong-hwan Cho[1], Jaeeun Lee[1], Heung Nam Han[1], Juseok Kang[2]
[1]Seoul National University, Korea, [2]POSCO, Korea

2-0906 Ultrafine Grained Medium and High C Steel Long Products by Multi-Pass Warm Caliber Rolling
09:20-09:40 Ilaria Salvatori[1], Claudio Guarnaschelli[1], Zurine Idoyaga Olano[2], Amaia Iza-Mendia[3], Stefan Meiler[4], Francesco Papini[5], Stefan Senge[6]
[1]Rina Consulting-Centro Sviluppo Materiali, Italy, [2]Sidenor, Spain, [3]Ceit-IK4 and Universidad de Navarra, Spain, [4]Technische Universität Bergakademie Freiberg, Germany, [5]Aferpi Steel Company, Italy, [6]RWTH Aachen University, Germany

2-0634 Micromechaniism of Cleavage Fracture in a Low Carbon MnCrMoNiCu Steel with Bainitic/ Martensitic Microstructures
09:40-10:00 Dongsheng Liu, Mi Luo, Binggui Cheng, Jinbo Qu
Jiangsu Shagang Group Co., Ltd, China

2-0581 A New Mechanism for the Formation of θ-Fe_3C in Carbon Steels
10:00-10:20 D. H. Ping, T. Ohmura
National Institute for Materials Science, Japan

1-6. AHSS (DP, TRIP, TWIP, HPF etc)

November 20 (Tue) *Ballroom 2 (2F)*

Chair Dirk Ponge (Max-Planck-Institut für Eisenforschung GmbH, Germany)

1-0875 Niobium Applied Technology in Future Mobility
10:40-11:10 Tiago Carneiro da Costa, Rodrigo Amado
INVITED *Companhia Brasileira de Metalurgia e Mineração, Brazil*

1-0141 Influence of Nb and V on Microstructure and Mechanical Properties of Hot–Rolled Medium Mn Steels
11:10-11:30 Yuanshen Zhu[1], Bin Hu[1], Haiwen Luo[1], Jinbing Zhang[2], Feng Liu[2]
[1]University of Science and Technology Beijing, China, [2]Northwestern Polytechnical University, China

1-0239 Effect of Alloying on Phase Transformation in High Strength Q&P Steels
11:30-11:50 Olga Girina[1], Oleg Yakubovsky[1], Damon Panahi[1], Steve Jansto[2]
[1]ArcelorMittal Global Research East Chicago, USA, [2]CBMM North America, Inc., USA

1-0830 Effects of One-step Partitioning Processes on Vanadium Alloyed Q&P Steel
11:50-12:10 Gongting Zhang[1,2], Zhiwang Zheng[1]
[1]Pangang Group Research Institute Co., Ltd., China, [2]University of Science and Technology Beijing, China

1-7. AHSS (DP, TRIP, TWIP, HPF etc)

November 20 (Tue) *Ballroom 2 (2F)*

Chair Haiwen Luo (University of Science and Technology Beijing, China)

1-0275 13:20-13:50 INVITED
Physical Metallurgy of Segregation and Its Impact on Embrittlement and Austenite Reversion in Medium Mn Steels
Alisson Kwiatkowski da Silva, Dirk Ponge, Zirong Peng, Margarita Kuzmina, Gerhard Inden, Baptiste Gault, Dierk Raabe
Max-Planck-Institut für Eisenforschung GmbH, Germany

1-0310 13:50-14:10
Improving Mechanical Properties of Medium Mn Steel through a Morphological Transition from a Nanolaminate to a Nanosized Globular Microstructure
Jeongho Han[1], Min Tae Kim[1], Tak Min Park[1], Kyeong-Ho Baik[1], Alisson Kwiatkowski da Silva[2], Aniruddha Dutta[2], Dirk Ponge[2], Dierk Raabe[2]
[1]Chungnam National University, Korea, [2]Max-Planck-Institut für Eisenforschung GmbH, Germany

1-0699 14:10-14:30
Microstructure and Mechanical Properties of a Coldrolled Mn-Al Type Medium-Mn Steel
He-song Wang, Yuan-xiang Zhang, Jian Kang, Yun-jie Li, Guo Yuan, Guo-dong Wang
Northeastern University, China

1-0348 14:30-14:50
Effect of Texture and Spatial Alignment of Reverted Austenite on Mechanical Properties of Hot and Cold Rolled Medium Manganese Steel
Aniruddha Dutta[1], Jeongho Han[2], Dirk Ponge[1], Stefanie Sandlöbes[1, 3], Dierk Raabe[1]
[1]Max-Planck-Institut für Eisenforschung GmbH, Germany, [2]Chungnam National University, Korea, [3]RWTH Aachen, Germany

1-0791 14:50-15:10
Effect of Refined Blocked Retained Austenite on Properties in Medium-Carbon Enriched-Chromium Steel
Wei Liu[1], Bing Zhang[1], Aimin Zhao[1], Hui Guo[2], Shaoheng Sun[1]
[1]University of Science and Technology Beijing, China, [2]Weifang University of Science and Technology, China

1-0607 15:10-15:30
Strain Hardening Behavior and Tensile Properties of Austenitic Medium Manganese High Carbon Steels
Guoqing Luan, Olena Volkova, Javad Mola
Technische Universität Bergakademie Freiberg, Germany

7-1. Computational modeling

November 20 (Tue) *Ballroom 3 (2F)*

Chair Yoshitaka Adachi (Nagoya University, Japan)

7-0568 08:30-09:00 INVITED
Computational Modelling of Phase Transformations in Advanced Steels
Matthias Militzer
The University of British Columbia, Canada

7-0732 First-Principles Simulation of Grain Boundary Segregation in Steels
09:00-09:20 Jingliang Wang[1], Georg K. H. Madsen[2], Ralf Drautz[3], Chengjia Shang[1]
[1]University of Science and Technology Beijing, China, [2]Technische Universität Wien, Austria, [3]Ruhr-Universität Bochum, Germany

7-0599 Numerical Modeling of Moving Interfaces under Local Equilibrium Conditions
09:20-09:40 Jae Sang Lee[1], Dong-Woo Suh[1], Yang Mo Koo[1], Seong Gyoon Kim[2]
[1]Pohang University of Science and Technology, Korea, [2]Kunsan National University, Korea

7-0800 Analysis of Residual Stress in Hot Rolled High Strength Steel during Laminar Cooling
09:40-10:00 Luo Xu
Pangang Group Research Institute Co., Ltd., China

7-0856 Research of a New Electromagnetic Stirring Technology
10:00-10:20 Qing-tao Guo, Xue-feng Tang, Ji-xiang Jia, Bai-gang Jin, Chun-lin Peng, Ming-liang Chai
State Key Laboratory of Metal Material for Marine Equipment and Application, China

7-2. Computational modeling

November 20 (Tue) *Ballroom 3 (2F)*

Chair Jae Hoon Jang (Korea Institute of Materials Science, Korea)

7-0469 Materials Backcasting -Two AI-Material Genome Integration Systems for Phase and Property Analysis-
10:40-11:10 Yoshitaka Adachi, Zhi-Lei Wang
INVITED *Nagoya University, Japan*

7-0502 Study on Fracture Behavior during Hole Expansion Test Using Realistic Microstructure Based Dual-Scale Approach
11:10-11:30 Siwook Park[1], Jinwook Jung[1], Kyung Il Kim[1], Sung Il Kim[2], Myoung-Gyu Lee[1], Heung Nam Han[1]
[1]Seoul National University, Korea, [2]POSCO, Korea

7-0381 A Thermodynamics-Based Model to Predict Martensite Start Temperature and Type of Martensite
11:30-11:50 Won-Mi Choi, Byeong-Joo Lee
Pohang University of Science and Technology, Korea

7-0419 A Generalized Method for Extracting Isothermal Kinetics from Non-Isothermal Data
11:50-12:10 Jeong Min Kim[1,2], Jae-Hyeok Shim[2], Kyung Jong Lee[1]
[1]Hanyang University, Korea, [2]Korea Institute of Science and Technology, Korea

7-3. Computational modeling

November 20 (Tue) *Ballroom 3 (2F)*

Chair Jae Sang Lee (Pohang University of Science and Technology, Korea)

7-0135 Difficulties in the Theory of Ferrite Growth Kinetics –The Problem of Sharp Concentration Gradients
13:20-13:50 Harshad K. D. H. Bhadeshia
INVITED *University of Cambridge, UK*

7-0596 Coarsening Behavior of Cr_2b of Borated Stainless Steel and Its Effects on Mechanical Properties
13:50-14:10 Chihyoung Won[1, 2], Jae Hoon Jang[1], Heon-Young Ha[1], Joonoh Moon[1], Jun-Yun Kang[1], Chang-Hoon Lee[1], Tae-Ho Lee[1]
[1]Korea Institute of Materials Science, Korea, [2]Pusan National University, Korea

7-0335 Pinning Force on Edge Dislocation Due to C and N Atoms in Iron Analyzed by Molecular Dynamics Simulation
14:10-14:30 Katsutoshi Hyodo, Satoshi Araki, Shinji Munetoh, Toshihiro Tsuchiyama, Setsuo Takaki
Kyushu University, Japan

7-0589 Low-Transformation-Temperature Effects in a Multipass Steel Weld Studied by Experiments and Simulations
14:30-14:50 Huai Wang[1, 2], Wanchuck Woo[2], Dongkyu Kim[2], Vyacheslav Em[3], Gyubaek An[4], Sooyeol Lee[1]
[1]Chungnam National University, Korea, [2]Korea Atomic Energy Research Institute, Korea, [3]NRC Kurchatov Institute, Russia, [4]Chosun University, Korea

6-1. Hydrogen embrittlement

November 20 (Tue) *Ballroom 4 (2F)*

Chair Jin-Yoo Suh (Korea Institute of Science and Technology, Korea)

6-0273 Micrometer-scale Dislocation Motion in Apparently Stress-free Samples: An Unexpected Hydrogen Effect
08:30-09:00 INVITED Cem Tasan
Massachusetts Institute of Technology, USA

6-0465 Effect of Carbides on the Hydrogen Embrittlement in High Strength Steels
09:00-09:20 Junmo Lee, Jung Hwan Gyo
POSCO, Korea

6-0598 Hydrogen Trapping and Desorption in Q&T Martensitic Steel Strengthened by Co-Precipitation
09:20-09:40 Yu Chen Lin[1], Hsin-Chih Lin[1], Ingrid McCarroll[2], Julie M. Cairney[2], Hung-Wei Yen[1]
[1]National Taiwan University, Taiwan, [2]The University of Sydney, Australia

6-0899 Effect of Microstructure to Hydrogen Delayed Fracture on Hot-Stamped Boron Steels
09:40-10:00 Hye-Jin Kim, Won-Seog Yang, Seung-Chae Yoon, Tae-Woo Kwon, Yoo-Dong Chun, Seong-Ju Kim
Hyundai Steel Company, Korea

6-0264 Effects of Precipitates on Hydrogen Embrittlement of Temepred Martensitic Steels
10:00-10:20 Hyunjoo Seo[1], Junmo Lee[2], Chong Soo Lee[1]
[1]Pohang University of Science and Technology, Korea, [2]POSCO, Korea

6-2. Hydrogen embrittlement

November 20 (Tue) *Ballroom 4 (2F)*

Chair Motomichi Koyama (Kyushu University, Japan)

6-0794 **Development of High Strength Steels with High Resistance to Hydrogen Induced Delayed Cracking through Microstructure Engineering**
10:40-11:10
INVITED
Jian Bian
Niobium Tech Asia, Singapore

6-0930 **Effect of C on H Embrittlement in Martensitic Steels**
11:10-11:30
W. T. Geng[1, 2], V. Wang[1], J. X. Li[2], N. Ishikawa[3], H. Kimizuka[1], K. Tsuzak[4, 5], S. Ogata[1, 5]
[1]Osaka University, Japan, [2]University of Science and Technology Beijing, China, [3]JFE Steel Corporation, Japan, [4]Kyushu University, Japan, [5]Kyoto University, Japan

6-0657 **Phase-Field Modelling of Hydrogen Diffusion and Trapping in Pure Iron**
11:30-11:50
Jun Zhang, Boning Zhang, Yi Zong, Zhigang Yang, Chi Zhang, Hao Chen
Tsinghua University, China

6-0522 **Effects of Microstructural Behavior on Hydrogen Embrittlement for Offshore-Platform Ferritic Steels**
11:50-12:10
Cheolho Park[1], Stephen Liu[2], Yangdo Kim[1], Myunghyun Kim[1], Namhyun Kang[1]
[1]Pusan National University, Korea, [2]Colorado School of Mines, USA

6-3. Hydrogen embrittlement

November 20 (Tue) *Ballroom 4 (2F)*

Chair Young-Kook Lee (Yonsei University, Korea)

6-0431 **Stacking Fault Energy Measurement of CrMnFeCoNi High Entropy Alloy Studied by Transmission Electron Microscopy**
13:20-13:50
INVITED
Han-Jin Kim[1, 2], Min-Kyung Cho[1], Gyeung-Ho Kim[1], Jin-Yoo Suh[1], Joonho Lee[2]
[1]Korea University, Korea, [2]Korea Institute of Science and Technology, Korea

6-0477 **In Situ Hydrogen Mapping by Silver Decoration: Effects of Grain Orientation and Boundary Character**
13:50-14:10
Motomichi Koyama, Daisuke Yamasaki, Kaneaki Tsuzaki
Kyushu University, Japan

6-0694 **Hydrogen-Induced Embrittlement in Yoke 8625M HSLA Steel**
14:10-14:30
Y.T. Hsu[1], H.Y. Jiang[1], H.C. Lin[1], H.W. Yen[1], Steven Hong[2]
[1]National Taiwan University, Taiwan, [2]Yoke Industrial Corporation, Taiwan

6-0434 **Hydrogen Effect of Creep Behavior in Ferritic Steel**
14:30-14:50
Han-Jin Kim[1, 2], Jin-Yoo Suh[1], Joonho Lee[2]
[1]Korea University, Korea, [2]Korea Institute of Science and Technology, Korea

6-0555 Plasticity-Driven Hydrogen Embrittlement in Stable and Metastable High Entropy Alloys

14:50-15:10 Kenshiro Ichii[1], Motomichi Koyama[1], Cemal Cem Tasan[2], Kaneaki Tsuzaki[1]
[1]Kyushu University, Japan, [2]Massachusettes Institute of Technology, USA

6-0444 Microstructure Characterization and Hydrogen Detection via SKPFM Measurements on High Strength Steels

15:10-15:30 Darya Rudomilova[1], Tomáš Prošek[1], Gabriela Schimo-Aichhorn[2], Andreas Muhr[3], Hubert Duchaczek[3], Gerald Luckeneder[3]
[1]Technopark Kralupy, Czech Republic, [2]CEST Competence Center for Electrochemical Surface Technology, Austria, [3]Voestalpine Stahl GmbH, Austria

1-8. AHSS (DP, TRIP, TWIP, HPF etc)

November 21 (Wed) *Ballroom 1 (2F)*

Chair Yoon-Uk Heo (Pohang University of Science and Technology, Korea)

1-0928 08:30-09:00 INVITED
Influence of Microstructure on the Hole Expansion Property in the Medium Manganese Steel
Hyang Jin Koh, Nam Hoon Goo, Min Sung Kim, Sang Wook Lee
Hyundai Steel, Korea

1-0547 09:00-09:20
Warm Ductility during Austenite Reversion in Cold-rolled & Hot-Rolled Mn-Rich Steels
Guan-Ju Cheng, Hung-Wei Yen
National Taiwan University, Taiwan

1-0480 09:20-09:40
Fracture Mechanisms of Medium Mn Steels with and without Delta-Ferrite
Binhan Sun[1, 2], Dirk Ponge[1], Fateh Fazeli[3], Colin Scott[3], Stephen Yue[2], Dierk Raabe[1]
[1]Max-Planck-Institut für Eisenforschung GmbH, Germany, [2]McGill University, Canada, [3]CanmetMATERIALS, Canada

1-0685 09:40-10:00
Effect of Temperature on Fracture Toughness of High-Mn Steels Based on the J-integral Method
Kwanho Lee[1], Junhyuk Park[1], Hyokyung Sung[1], Yongjin Kim[2], Sungkyu Kim[3], Sangshik Kim[1]
[1]Gyeongsang National University, Korea, [2]Agency for Defense Development, Korea, [3]POSCO, Korea

1-0295 10:00-10:20
Effect of Al on the Mechanical Properties in Cold-rolling Medium Mn-TRIP Steels during Austenitization and Annealing Treatment
M. K. Bai, G. D. Wang, H. L. Yi
Northeastern University, China

1-9. AHSS (DP, TRIP, TWIP, HPF etc)

November 21 (Wed) *Ballroom 1 (2F)*

Chair Hung-Wei Yen (National Taiwan University, Taiwan)

1-0268 10:40-11:10 INVITED
Discussion on Hall-Petch Coefficient of Ferritic Steel Based on Experimentally Measured Critical Grain Boundary Shear Stress
Toshihiro Tsuchiyama[1], Katsuya Mashima[1], Satoshi Araki[1], Setsuo Takaki[1], Takahiro Ohmura[2]
[1]Kyushu University, Japan, [2]National Institute for Materials Science, Japan

1-0129 11:10-11:30
Microstructure and Mechanical Properties of Low Density δ-TRIP Steel
Yinghua Jiang[1, 2], Shuang Kuang[1, 2], Chunqian Xie[1, 2], Xiaojing Shao[1, 2]
[1]Shougang Group Co., Ltd., China, [2]Beijing Key Laboratory of Green Recyclable Process for Iron & Steel Production Technology, China

1-0291 11:30-11:50
Low Density and Advanced High-Strength δ-TRIP Steel
B.Y. Xu[1], R.D. Liu[2], X. Xu[2], J.Y. Guo[2], D. Wu[1], H.L. Yi[1]
[1]Northeastern University, China, [2]Ansteel Group, China

1-0450 11:50-12:10 Solidification Mode, Temperature Dependence of Mechanical Properties, and Deformation Mechanisms in Al and Co-Added Austenitic Stainless Steels
Reza Rahimi, Olena Volkova, Horst Biermann, Javad Mola
Technische Universität Bergakademie Freiberg, Germany

1-10. AHSS (DP, TRIP, TWIP, HPF etc)

November 21 (Wed) *Ballroom 1 (2F)*

Chair Jeongho Han (Chungnam National University, Korea)

1-0867 13:20-13:50 INVITED Tensile Properties of Tempered-Martensitic Medium Mn Lightweight Steel
Sukjin Lee, Young-Kook Lee
Yonsei University, Korea

1-0551 13:50-14:10 ε-Martensite Plasticity Associated with Fatigue Crack Growth in a Metastable High-Entropy Alloy
Takeshi Eguchi[1], Motomichi Koyama[1], Yoshihiro Fukushima[1], Cemal Cem Tasan[2], Kaneaki Tsuzaki[1]
[1]Kyushu University, Japan, [2]Massachusettes Institute of Technology, USA

1-0485 14:10-14:30 Effect of B2 Morphology on the Mechanical Properties of Dispersion Strengthened Lightweight Steels
Alireza Zargaran, Chungho Nam, Nack J. Kim
Pohang University of Science and Technology, Korea

1-0334 14:30-14:50 Microstructure and Mechanical Properties of New Nanobainite Steel
F.Y Zhao, H.L Yi, G.D Wang
Northeasten University, China

1-0748 14:50-15:10 A Study on Micromechanical Deformation Behavior in Lightweight Duplex Steel during Ex-Situ Uniaxial Tension Test
Eun-Young Kim[1], Min-Seong Kim[1], Wan-Chuck Woo[2], Dong-Kyu Kim[2], Shi-Hoon Choi[1]
[1]Sunchon National University, Korea, [2]Korea Atomic Energy Research Institute, Korea

1-11. AHSS (DP, TRIP, TWIP, HPF etc)

November 21 (Wed) *Ballroom 2 (2F)*

Chair Alireza Zargaran (Pohang University of Science and Technology, Korea)

1-0139 08:30-09:00 INVITED Ultrahigh Strength Deformed and Partitioned (D&P) Steel Achieved by Dislocation Engineering
M.X. Huang, B.B. He
The University of Hong Kong, China

1-0672 09:00-09:20 Microstructure-Properties Correlation in 1.5GPa Grade Tempered Martenstic Steels Treated by Quenching & Tempering (Q&T): Roles of Elemental Ni and Spheroidizing Annealing on Cementite Formation
Hwangoo Seong, Yeolrae Cho, Sangho Han
POSCO, Korea

1-0362 Investigation of Mechanical Properties on Hot Stamped Martensitic Automotive Steel
09:20-09:40 Byung-Gil Yoo[1], Guang-Hui Yang[2], Chee Woong Song[1], Chun Gu Kang[1], Hyoung Hyup Do[1], Sung Yul Huh[1], Jae-il Jang[2], Seong Ju Kim[1]
[1]Hyundai Steel, Korea, [2]Hanyang University, Korea

1-0332 Microstructures and Mechanical Properties of an Ultra-Fine Grained 2GPa Press-Hardening Steel
09:40-10:00 Zhiyuan Chang[1], Zhaoyuan Liu[1], Hongliang Liu[2], Di Wu[1], Hongliang Yi[1]
[1]Northeastern University, China, [2]Benxi Steel Plates Co., Ltd., China

1-0343 Understanding the Fracture Mode Change by Paint-baking in Weldment of Ultra-High Strength Steels Based on Tempering Kinetics
10:00-10:20 Kwangjoong Kim[1], Gitae Park[1], Sangho Uhm[2], Hongcheol Jeong[2], Changhee Lee[1]
[1]Hanyang University, Korea, [2]POSCO, Korea

3-3. Special steels (stainless steels, tool steels, heat resistant alloys)

November 21 (Wed) *Ballroom 2 (2F)*

Chair Hyun Uk Hong (Changwon National University, Korea)

3-0373 Aging Effect on Mechanical Behavior of High-Mn Low-Density Steels
10:40-11:10 Heung Nam Han[1], Keunho Lee[2], Jaeeun Lee[1], Joonoh Moon[3], Seong-Jun Park[3]
INVITED *[1]Seoul National University, Korea, [2]Agency for Defense Development, Korea, [3]Korea Institute of Materials Science, Korea*

3-0201 Two Stage TRIP Behavior of a Reversely Transformed Fe-Cr-Mn Stainless Steel
11:10-11:30 Jeom Yong Choi[1], Ik Soo Shin[2], Kyung-Tae Park[2]
[1]Zhangjiagang Pohang STS Co. Ltd., Korea, [2]Hanbat National University, Korea

3-0494 Improvement of Mechanical Properties in a Harmonic Structure Designed SUS304L Stainless Steel via Thermomechanical Processing
11:30-11:50 Kei Ameyama, Masashi Nakatani, Mie Kawabata
Ritsumeikan University, Japan

3-0889 Material Properties and Size Changes of SUS440B Steel during Their Heat Treatment for Precision Component of High Pressure Injector in Powertrain
11:50-12:10 Jin Han Lee, Heon Joon Park, Sung Chul Cha
Hyundai Motor Group-Hyundai KEFICO, Korea

3-4. Special steels (stainless steels, tool steels, heat resistant alloys)

November 21 (Wed) *Ballroom 2 (2F)*

Chair Heung Nam Han (Seoul National University, Korea)

3-0209 Grain Refinement Achieved by Hetero-Epitaxial Nucleation during Rapid Solidification in a Newly Developed Ferritic Stainless Steel for High Formability
13:20-13:50 H. U. Hong[1], J. Y. Kim[1], J. H. Kim[1], Y. T. Cho[1], W. B. Lee[2], S. K. Kim[2]
INVITED *[1]Changwon National University, Korea, [2]POSCO, Korea*

3-0532 Development of High Performance Hot Working Tool Steel for Automotive Parts Manufacturing
13:50-14:10 Byoungkoo Kim, Jeongwook Kim, Kukcheol Kim, Jaesuk Jeong, Jhinik Suk
Doosan Heavy Industries & Construction, Korea

3-0849 Evaluation of Creep-Fatigue Properties of F82H Steel by Considering Interaction of Non-Proportional Loading and Relaxation
14:10-14:30 Yuuki Kasamuta[1], Fumio Ogawa[1], Yuuya Murakami[1], Takamoto Itoh[1], Hiroyasu Tanigawa[2]
[1]Ritsumeikan University, Japan, [2]National Institutes for Quantum and Radiological Science and Technology, Japan

3-0403 Mechanism for Z-phase Formation in 11CrMoVNbN Martensitic Heat-Resistant Steel
14:30-14:50 Myung-Yeon Kim[1, 2], Woo-Sang Jung[1], Young-Su Lee[1], Young-Kook Lee[2], Jae-Hyeok Shim[1]
[1]Korea Institute of Science and Technology, Korea, [2]Yonsei University, Korea

3-0408 Study on Controlling Microstructure for Fire Resistant Steel and Their Strengthening Mechanism on High Temperature
14:50-15:10 Yong Min Hyun[1, 2], In Kim[1], Eung Yeul Park[1], Cheol Woong Yang[2]
[1]Hyundai Steel Company, Korea, [2]Sungkyunkwan University, Korea

4-1. Coating, corrosion and welding

November 21 (Wed) *Ballroom 3 (2F)*

Chair Seong Jun Park (Korea Institute of Materials Science, Korea)

4-0277 Study on Internal Oxidation Behavior of Si-added TRIP Steel
08:30-09:00 Suk-Kyu Lee, Myung-Soo Kim
INVITED *POSCO, Korea*

4-0827 Weldability of Automotive Sheet Steels beyond Generation 1 Advanced High Strength Steels
09:00-09:30 Murali Tumuluru
INVITED *U. S. Steel, USA*

4-0323 Effect of Si Addition on Coating Layer of Al Coated Steel Sheets after Hot Press Process
09:30-09:50 Seonjin Kim, Kyung Kwan Park, Taehun Lim, Moonhi Hong
POSCO C&C, Korea

4-0369 Roles of Mo in Reducing Further Oxidation of 22MnB5 Steels in Hot Stamping
09:50-10:10 Biao Deng, Guodong Wang, Hongliang Yi
Northeastern University, China

4-2. Coating, corrosion and welding

November 21 (Wed) *Ballroom 3 (2F)*

Chair Namhyun Kang (Pusan National University, Korea)

4-0161 **Various Types of Liquid Metal Embrittlement Cracking in Resistance Spot Welding of Zn Coated Advanced High Strength Steels**
10:40-11:10
INVITED
Yeong-Do Park, Siva Prasad Murugan
Dong-Eui University, Korea

4-0454 **Effects of Surface Coating on Weldability of Resistance Spot-Welded Hotstamped Boron Steels**
11:10-11:30
Changwook Ji[1], JaeHun Kim[1], Joo-Yong Cheon[1], Yeong-Do Park[2]
[1]Korea Institute of Industrial Technology, Korea, [2]Dong-Eui University, Korea

4-0738 **Improving Fatigue Properties of Dual Phase Giga Steel Welds for Auto Parts**
11:30-11:50
Gyuyeol Bae[1], Gitae Park[2], Hongcheol Jeong[1], Changhee Lee[2]
[1]POSCO, Korea, [2]Hanyang University, Korea

4-0751 **Weldability of Reduced Activation Ferritic-Martensitic Steels for Fusion Reactor**
11:50-12:10
Joonoh Moon, Jin-Jong Lee, Chang-Hoon Lee, Tae-Ho Lee, Seong-Jun Park
Korea Institute of Materials Science, Korea

4-3. Coating, corrosion and welding

November 21 (Wed) *Ballroom 3 (2F)*

Chair Yeong-Do Park (Dong-Eui University, Korea)

4-0523 **Formation Behavior of δ Ferrite and Pitting Behavior within LB and GTA Weld Zone of Mod. 9Cr-1Mo Steel in Terms of Thermal History**
13:20-13:50
INVITED
Nam-hun Jung[1, 2], Sung-Yong Ahn[3], Byeongrok Moon[1], Kyung-Mox Cho[1], Namhyun Kang[1]
[1]Pusan National University, Korea, [2]Korea Aerospace Industries Co., Ltd., Korea, [3]Doosan Heavy Industries and Construction Co., Ltd., Korea

4-0443 **Corrosion Behavior of Cu-Containing Low Alloy Steel in Flue Gas Environment**
13:50-14:10
Byoung Ho Lee, Minho Jo, Jong Tae Park, Yun Ha Yoo
POSCO, Korea

4-0462 **The Origin of Degraded Bendability and Related Crack during Galvanizing of Zn-Al Coated Martensitic Steels**
14:10-14:30
Jae Bok Seol[1], Seon Hyeong Na[1], Min Seo Gu[2]
[1]Pohang University of Science and Technology, Korea, [2]POSCO, Korea

4-0565 **Effect of Surface Roughness on the Grain Size and Crystallographic Texture of Hot-Dip Galvanized Sheet Steel Coatings**
14:30-14:50
Gu-Jin Chung[1], Joo-Youl Huh[1], Hyun-Seok Hwang[2], Sang-Heon Kim[2]
[1]Korea University, Korea, [2]POSCO, Korea

4-0808 14:50-15:10 Influence of Bis-3-Sulfopropyl-Disulfide on the Current Efficiency and Properties of Trivalent Chromium Electrodeposition
Sol-Ji Song[1], Sang Jin Ko[1], Jae-Ryung Lee[2], Jung-Gu Kim[1]
[1]Sungkyunkwan University, Korea, [2]POSCO, Korea

6-4. Hydrogen embrittlement

November 21 (Wed) *Ballroom 4 (2F)*

Chair Jian Bian (Niobium Tech Asia, Singapore)

6-0504 08:30-09:00 INVITED Hydrogen Permeation in High Mn Austenitic Steels
Do-Kyeong Han, A-In Hwang, Dong-Woo Suh
Pohang University of Science and Technology, Korea

6-0556 09:00-09:20 Strain Rate Effects on Damage Tolerance in a Hydrogen-Charged Dual-Phase Steel : Crack Initiation, Arrest, and Growth to Failure
Tsubasa Kumamoto, Motomichi Koyama, Kaneaki Tsuzaki
Kyushu University, Japan

6-0360 09:20-09:40 Effects of Hydrogen on Deformed Microstructure in 2Mn-0.1C Ferritic Steel
Kazuho Okada[1], Akinobu Shibata[1, 2], Wu Gong[2, 3], Nobuhiro Tsuji[1, 2]
[1]Kyoto University, Japan, [2]Elements Strategy Initiative for Structural Materials, Japan, [3]Japan Atomic Energy Agency, Japan

8-2. Advanced characterization

November 21 (Wed) *Ballroom 4 (2F)*

Chair Jee-Hyun Kang (Yeongnam University, Korea)

8-0787 10:40-11:10 INVITED Collective Motion of Dislocation Associated with Local Plasticity Initiation and Subsequent Behavior in BCC Metals
Takahito Ohmura
National Institute for Materials Science, Japan

8-0281 11:10-11:30 Atomic-Scale Characterization of Boron Segregation at Austenite Grain Boundaries and Its Temperature and Grain Boundary Character Dependences
Goro Miyamoto[1], Ai Goto[1], Naoki Takayama[2], Yoshiaki Murakami[2], Tadashi Furuhara[1]
[1]Tohoku University, Japan, [2]JFE Steel Corporation, Japan

8-0643 11:30-11:50 Effect of Grain Sizes on Nanoindentation Induced Plasticity Initiation in Interstitial Free Steel
Hongxing Li[1], Si Gao[2], Ruzic Jovana[1], Nobuhiro Tsuji[2], Takahito Ohmura[1]
[1]National Institute for Materials Science, Japan, [2]Kyoto University, Japan

8-0902 11:50-12:10 Developments in Advanced Analytical Microscopy in the Steel Industry
Andy Holwell
Carl Zeiss Microscopy Ltd, UK

5-2. Forming and shaping

November 21 (Wed) *Ballroom 4 (2F)*

Chair Dayong Li (Shanghai Jiao Tong University, China)

5-0306 13:20-13:40 **Effect of Pre-Strain Mode on the Low-Cycle Fatigue Property of Dual-Phase Steel**

Hyuksun Kwon[1], Frédéric Barlat[2]

[1]POSCO, Korea, [2]Pohang University of Science and Technology, Korea

5-0638 13:40-14:00 **Effect of Yield Stress Determination for Two Surface Hardening Model on the Springback Prediction in DP 780 Steel Sheet**

Jinwoo Lee[1], Hyuk Jong Bong[1], Daeyong Kim[1], Young-Seon Lee[1], Myoung-Gyu Lee[2]

[1]Korea Institute of Materials Science, Korea, [2]Seoul National University, Korea

5-0718 14:00-14:20 **Effect of Electric Current in Metal Alloy during Uniaxial Tension**

Moon-Jo Kim[1], Hye-Jin Jeong[2], Ju-Won Park[2], Kyooyoung Lee[3], Sung-Tae Hong[4], Heung Nam Han[2]

[1]Korea Institute of Industrial Technology, Korea, [2]Seoul National University, Korea, [3]POSCO, Korea, [4]University of Ulsan, Korea

5-0779 14:20-14:40 **Modeling Self-Piercing Riveting Process and Lap-Shear Strength Prediction by Finite Element Simulation**

Chanyang Kim[1], Sejin Ko[2], Hyoung Jong Kim[3], Myoung-Gyu Lee[1]

[1]Seoul National University, Korea, [2]Hyundai Motor Company, Korea, [3]Kangwon National University, Korea

1. AHSS (DP, TRIP, TWIP, HPF etc)

16:00-18:00, November 20 (Tue) *Lobby (2F)*

Chairs Wolfgang Bleck (RWTH Aachen University, Germany)
Christopher Hutchinson (Monash University, Australia)
Jer-Ren Yang (National Taiwan University, Taiwan)

1-0194 **Effect of Annealing Time on Mechanical Property of Medium-Mn Steel Treated with Interrupted-Quenched and Intercritical Annealing**
Shohei Tanaka[1], Takayuki Sakamoto[2], Toshihiro Tsuchiyama[1], Setsuo Takaki[1]
[1]Kyushu University, Japan, [2]Hitachi Metals, Ltd., Japan

1-0215 **Effect of Grain Size on Isothermal Transformation below M_s Temperature in Medium-Carbon Steel**
Yoshinori Amano, Takuro Masumura, Toshihiro Tsuchiyama, Setsuo Takaki
Kyushu University, Japan

1-0251 **Effect of Annealing Condition on Hole Expansion Ratio (HER) of Q&P Processed Medium Mn Steel**
Ji Hoon Kim, Dong-Woo Suh
Pohang University of Science and Technology, Korea

1-0299 **Effects of Paint-Baking on the Improvement of Weldment Toughness in Ultra-High Strength Steels for Automotive Applications**
Gitae Park[1], Kwangjoong Kim[1], Sangho Uhm[2], Hongcheol Jeong[2], Changhee Lee[1]
[1]Hanyang University, Korea, [2]POSCO, Korea

1-0442 **Atomistic Investigation on the C-Partitioning into *K*-carbides by Si Addition and the Interaction between *K*-carbides and Dislcoations**
Chiwon Kim[1], Seongju Park[1], Mathieu Terner[1], Jaehyun Lee[1], Joonoh Moon[2], Seongjun Park[2], Jaehoon Jang[2], Bongho Lee[3], Youngju Lee[4], Hyunuk Hong[1]
[1]Changwon National University, Korea, [2]Korea Institute of Materials Science, Korea, [3]Daegu Gyeongbuk Institute of Science & Technology, Korea, [4]Research Institute of Industrial Science & Technology, Korea

1-0503 **Phase Identification and Strain Measurement of AHSS during In-situ Tensile Test**
Kyung Il Kim, Yeonju Oh, Kyu Hwan Oh, Heung Nam Han
Seoul National University, Korea

1-0537 **High Temperature Torsion Behavior of Austenitic High Mn Steels**
Woojun Kim, Youn Ha Kim, Sung-Joon Kim
Pohang University of Science and Technology, Korea

1-0548 **Improvement of Mechanical Properties by Carbon Partitioning in Martensite Based 7Mn Steel**
Dong-Han Kim, Jee-Hyun Kang, Sung-Joon Kim
Pohang University of Science and Technology, Korea

1-0572 Performance Evaluation of Warm Stamped Medium Manganese Steel in 1500MPa Grade
Cunyu Wang[1], Ying Chang[2], Wenquan Cao[1], Han Dong[1]
[1]Central Iron and Steel Research Institute, China, [2]Dalian University of Technology, China

1-0690 Enhanced Mechanical Properties of Ultrahigh Strength Mn-Si-Cr-C Steels Treated by a Novel Bainitic Transformation Plus Quenching and Partitioning Process
Guhui Gao, Bingzhe Bai, Xiaolu Gui, Zhunli Tan, Yuqing Weng
Beijing Jiaotong University, China

1-0719 Influence of Grain Size on Strength and Toughness of High Manganese Austenitic Steels
Xinjun Sun[1], Xiaojiang Wang[1,2], Huan Chen[1], Qingyou Liu[1], Qilong Yong[1], Feng Pan[2]
[1]Central Iron and Steel Research Institute, China, [2]Tsinghua University, China

1-0756 Study on Tensile Properties and Microstructure of Tensile Necking in Low Temperature Bainitic Steel
Baoqi Dong, Tingping Hou, Guohong Zhang, Kaiming Wu
Wuhan University of Science and Technology, China

1-0934 The Effects of Cold Working Directions and Annealing for High-Mn Austenitic Steels on Mechanical Properties and Microstructure
Minha Park, Kwangyoon Kim, Jaeho Jang, Hyoung-Chan Kim, Hyoung-Seok Moon, Dae-Geun Nam, Byung Jun Kim
Korea Institute of Industrial Technology, Korea

1-0937 The Effect of Post Weld Heat Treatment for Welded High-Mn Austenitic Steels Using the Submerged arc Welding Process
Kwangyoon Kim, Minha Park, Hyoung-Seok Moon, Jaeho Jang, Hyoung Chan Kim, Jong Bae Jeon, Byung Jun Kim
Korea Institute of Industrial Technology, Korea

2. HSLA and carbon steels (TMCP, pipelines, bars and wires, etc)

16:00-18:00, November 20 (Tue) *Lobby (2F)*

Chairs Elena Pereloma (University of Wollongong, Australia)
Wung Yong Choo (Seoul National University, Korea)

2-0157 The Effect of Initial Microstructure on the Recrystallization Behavior of Cold Rolled Microalloyed Steel
Jong Myeong Kim
Hyundai-Steel, Korea

2-0182 Ex-situ Interrupted Bending Study for Bauschinger Effect Occurring during Pipe Forming of API X80 Linepipe Steels
Dae Woong Kim[1], Seok Su Sohn[2], Wan-Keun Kim[3], Ki-Seok Kim[3], Sunghak Lee[1]
[1]Pohang University of Science and Technology, Korea, [2]Max-Planck-Institut für Eisenforschung, Germany, [3]POSCO, Korea

2-0225 Effect of Retained Austenite on Hardness Change during Low-Temperature Tempering in Low-Carbon Martensitic Steel

Shohei Uranaka[1], Taiga Taniguchi[1], Takuro Masumura[1], Toshihiro Tsuchiyama[1], Setsuo Takaki[1], Masaaki Fujioka[2], Masahide Yoshimura[2], Ryuji Uemori[1]
[1]Kyushu University, Japan, [2]Nippon Steel and Sumitomo Metal Corporation, Japan

2-0262 Effect of Separation on the Fracture Behavior in X-70 Grade Textured Dual Phase Line-Pipe Steel

Yong-hwan Cho[1], Jaeeun Lee[1], Heung Nam Han[1], Juseok Kang[2], Wung Yong Choo[1]
[1]Seoul National University, Korea, [2]POSCO, Korea

2-0392 Effect of Isothermal Holding Temperature and Time on the Microstructure and Mechanical Properties of High-Carbon Nanostructured Bainite Steels

Ji-Min Lee[1], Hyeon-Seok Lim[1], Young-Beam Song[2], Jin-hee Ham[2], Hong-Kyu Kim[2], Byoungchul Hwang[1]
[1]Seoul National University, Korea, [2]Agency for Defense Development, Korea

2-0425 Brittle Crack Arrest Behavior of a Heavy-gauge Steel Plate

Ohjae Lee[1], Seok Gyu Lee[1], H.Y. Bae[2], H.C. Jeong[2], S.H. Lee[1], N.J. Kim[1]
[1]Pohang University of Science and Technology, Korea, [2]POSCO, Korea

2-0460 Nanoscale Structural and Chemical Evolution during Annealing of a Heavily Drawn Pearlitic Steel Wire Determine Macroscale Tensile Properties and Delamination Failure

Jae Bok Seol[1], Majid Jafari[1], Chan Woo Bang[2], Jong Chan Han[1], Seul Mi Park[1], Chan Gyung Park[1], Byeong Joo Lee[1]
[1]Pohang University of Science and Technology, Korea, [2]POSCO, Korea

2-0668 Correlation between Statistics of Intervariant Boundaries and Toughness in High Strength Low Alloyed Steel

Xiucheng Li, Xuelin Wang, Mingyu Sun, Chengjia Shang
University of Science and Technology Beijing, China

2-0707 The Study on the Interphase Precipitation Behavior of Fire-Resistant Steels

Xuemin Wang, Jinghua Cong, Chengjia Shang
University of Science and Technology Beijing, China

2-0728 The Enhancement of Both Strength and Plasticity by Nano B2 Clusters and Nano-γ Phase in a Low Carbon Low Alloy Steel

G. Han[1], Z.J. Xie[1], R.D.K. Misra[2], C.J. Shang[1]
[1]University of Science and Technology Beijing, China, [2]University of Texas at El Paso, USA

2-0770 Effect of High Magnetic Field on Carbon Content in Bainitic Ferrite

Wen Zhou, Tingpin Hou, Guohong Zhang, Kaiming Wu
Wuhan University of Science and Technology, China

2-0796 Effect of Heat-Input on Mechanical Properties of Heat Affected Zone in HSLA Steel

Kyoungjun Kim[1], Jiyoun Park[2], Yongjai Kwon[1], Junggu Lee[1], Sangyong Shin[1]
[1]University of Ulsan, Korea, [2]Hyundai Heavy Industry, Korea

3. Special steels (stainless steels, tool steels, heat resistant alloys)

16:00-18:00, November 20 (Tue) *Lobby (2F)*

Chairs Chengjia Shang (University of Science and Technology Beijing, China)
Setsuo Takaki (Kyushu University, Japan)
Kyung-Tae Park (Hanbat National University, Korea)

3-0125 **Creep Strength Enhancement of T/P23 Heat-Resistant Steel by the Elimination of Easily Coarsening $M_{23}C_6$**
Hyun Je Sung[1], Sung-Joon Kim[2]
[1]POSCO, Korea, [2]Pohang University of Science and Technology, Korea

3-0145 **Effect of Short Time Heat Treatment at Weld Zone on Corrosion Behavior of Super Duplex Stainless Steel UNS S 32750**
Byung-hyun Shin[1], Taemin Cha[2], Sanghyup Park[1], Wonsub Chung[1]
[1]Pusan National University, Korea, [2]Pohang Institute of Metal Industry Advancement, Korea

3-0178 **V and Cu Addition Effects on High-Temperature Strength in High-Ni Austenitic Stainless Steels**
Jisung Yoo[1], Won-Mi Choi[1], Seok Su Sohn[2], Byeong-Joo Lee[1], Gi-Yong Kim[3], Yong-Jun Oh[4], Sunghak Lee[1]
[1]Pohang University of Science and Technology, Korea, [2]Max-Planck-Institut für Eisenforschung, Germany, [3]Key Yang Precision, Korea, [4]Hanbat National University, Korea

3-0285 **The Effect of Strain Rate on Deformation Behavior of 15Cr-15Mn-4Ni Austenitic Stainless Steels Containing 0.2 wt% of C and/Or N**
Nithi Saenarjhan, Jee-Hyun Kang, Sung-Joon Kim
Pohang University of Science and Technology, Korea

3-0418 **Effect of Cr on Microstructures and Mechanical Properties in Low Density Steels with 12 wt.% Al**
Kyeong Won Kim[1], Chang-Hoon Lee[1], Heon-Young- Ha[1], Joon-Oh Moon[1], Jae-Hoon Jang[1], Seong-Jun Park[1], Tae-Ho Lee[1], Young-Joo Lee[2]
[1]Korea Institute of Materials Science, Korea, [2]Research Institute of Industrial Science & Technology, Korea

3-0448 **Effect of Magnetic Field on the Dislocation Density during Tempering of a 9 Cr Steel**
Long Chen, Kai-ming Wu
Wuhan University of Science and Technology, China

3-0488 **Effects of Al Content and Cooling Rate on Microstructure and Mechanical Properties of Fe-Mn-Al-C Light-Weight Steels**
Jun Young Park[1], Seong-Jun Park[1], Seongwon Park[1], Joonoh Moon[1], Tae-Ho Lee[1], Heung Nam Han[2], Kyeong Jae Jeong[2], Jong-Ho Shin[3]
[1]Korea Institute of Materials Science, Korea, [2]Seoul National University, Korea, [3]Doosan Heavy Industries & Construction, Korea

3-0513 **Microstructure Evolution of a New Stainless Steel during Hot Processing**
Guoqing Chen, Yuping Duan, Xingjun Lv
Dalian University of Technology, China

3-0519 Effects of the Nèel Temperatures of γ and ε phase on γ→ε Martensitic Transformation in Fe-17Mn Alloy
Seon-Min Choi, Young-Kook Lee
Yonsei University, Korea

3-0576 Influence of Tempering Time on the Microstructure and Mechanical Properties of AISI M42 High-Speed Steel
Yiwa Luo[1], Hanjie Guo[1], Xiaolin Sun[2], Jing Guo[1]
[1]University of Science and Technology Beijing, China, [2]Central Iron and Steel Research Institute, China

3-0586 High Temperature Deformation of Harmonic Structure Designed Stainless Steels
Morihiro Hariki[1], Masashi Nakatani[1], Koki Yagi[1], Mie O Kawabata[1], Cinzia Menapace[2], Kazuo Isonishi[3], Kei Ameyama[1]
[1]Ritsumeikan University, Japan, [2]University of Trento, Italia, [3]Shiga University, Japan

3-0729 Deformation and Fracture Behaviors of 316L Stainless Steels Fabricated by SLM Techniques under Uniaxial Tension
Amol Kale[1], Jaiveer Singh[1], Eun-Young Kim[1], Wi-Geol Seo[1], Mike Reece[2], Shi-Hoon Choi[1]
[1]Sunchon National University, Korea, [2]Queen Mary University of London, UK

3-0758 The Effect of Magnetic Field on Carbides and Dislocation Density after Tempering of High Chromium-containing Steel
Guanghui Wu, Tingping Hou, Kaiming Wu
Wuhan University of Science and Technology, China

3-0782 Preferential Recrystallization in Harmonic Structure Designed Ni by Thermo-Mechanical Processing
Masaya Nagata, Masashi Nakatani, Mie Ota, Kei Ameyama
Ritsumeikan University, Japan

3-0864 Development of EH40 Grade Steel Plate for Tandem EGW for Mega Container Ships
Seung Jae Jo[1], Jae Hong Ryu[1], Young Joo Cho[1], Young Jun Kim[1], Byung Chul Kim[2]
[1]Hyundai Steel, Korea, [2]Hyundai Heavy Industries, Korea

3-0876 Exteninfluences of Interstitial and Extrusion Temperature on Grain Boundary Segregation, Y-Ti-O Nanofeatures, and Mechanical Properties of Ferritic Steels
Jae Bok Seol[1], Jeoung Han Kim[2], Nana Kwabena Adomako[2], Andrews Nsiah Ashong[2]
[1]Pohang University of Science and Technology, Korea, [2]Hanbat National University, Korea

3-0911 Effects of Thermo-Mechanical Processing on Microstructure and Mechanical Properties of Reduced-activation Ferritic-Martensitic Steel
Young-Bum Chun[1], Chang-Kyu Rhee[1], Dong-Won Lee[1], Yi-Hyun Park[2]
[1]Korea Atomic Energy Research Institute, Korea, [2]Korea Atomic Energy Research Institute, Korea, [3]Natioinal Fusion Research Institute, Korea

3-0920 Effect of Minor Ti Addition on High Temperature Mechanical Properties and Microstructure Evolution of Ni-Cr-Mo Superalloy
Ming-Yen Li, Shih-Ming Kuo, Chien-Lin Lai, Yeong-Tsuen Pan
China Steel Corporation, Taiwan

3-0932 Ultrahigh-Strength Steel via Co-Precipitation of Nanoscale M_2C and NiAl Precipitates
Chundong Hu, Han Dong, Jing Xu, Tengshi Liu, Hongshan Zhao
Shanghai University, China

3-0951 The Effect of High Magnetic Field on the Carbide Precipitation of Fe-C-W Steel
Guanghui Wu, Tingping Hou, Kaiming Wu, Yihang Zheng
Wuhan University of Science and Technology, China

3-0954 Effect of High Magnetic Field on Carbon Content in Bainitic Ferrite
W. Zhou, Zhiqiang You, Hengfu Lin, Tingping Hou, Kaiming Wu
Wuhan University of Science and Technology, China

4. Coating, corrosion and welding

16:00-18:00, November 20 (Tue) *Lobby (2F)*

Chairs Murali Tumuluru (U. S. Steel, USA)
Suk-Kyu Lee (POSCO Technical Research Laboratories, Korea)
Shi Hoon Choi (Suncheon National University, Korea)

4-0147 Effect of Austenite Volume Fraction on Weldability Resistance Spot Welding of Super Duplex Stainless Steel UNS S 32750
Byung-hyun Shin[1], Taemin Cha[2], Junghyun Park[1], Wonsub Chung[1]
[1]Pusan National University, Korea, [2]Pohang Institute of Metal Industry Advancement, Korea

4-0175 A Welding Characteristics of Large Caliber-Thick Plate Pressure Vessel Low Alloy Steel (Manganese-Molybdenum)
Jong Seok Ahn
Korea East-west Power Co., Ltd., Korea

4-0183 Resistance Spot Welding of a Fe-Al-Mn-C Lightweight Steel
Siva Prasad Murugan, Kaisar Mahmud, Junsu Kim, Tae Yeong Kang, Yeong-Do Park
Dong-Eui University, Korea

4-0205 Non-destructiive Testing and Dissimilar Spot Weldability in Advanced High Strength Steels
Young Gon Kim, Hyun Rok Cha
Korea Institute of Industrial Technology, Korea

4-0289 Silicon Effect on Zinc Liquid Metal Embrittlement of TWIP Steels
Seok-Hyun Hong[1], Doyub Kim[1], Jee-Hyun Kang[1], Jae-Hyun Kwak[2], Sung-Joon Kim[1]
[1]Pohang University of Science and Technology, Korea, [2]POSCO, Korea

4-0378 Oxidation Behavior of AHSS
Minhyeok Kwon[1], Kichul Kang[2], Dong-woo Suh[1]
[1]Pohang University of Science and Technology, Korea, [2]POSCO, Korea

4-0517 Study on Mechanical Properties of Al-Cr-X (Zr, Ti) –N Coating Prepared by Magnetron Sputtering
Han-Chan Lee[1], Hae-Won Yoon[1], Hun Jung[1,2], Se-pil Oh[1,2], Kyoung-Il Moon[1]
[1]Korea Institute of Industrial Technology, Korea, [2]Inha University, Korea

4-0652 Microstructure and Mechanical Properties of Zr Based Films Prepared by Magnetron Sputtering
Hae Won Yoon[1], Han Chan Lee[1], Se Pil Oh[1], Hun Jung[1], Se Hun Kwon[2], Kyoung Il Moon[1]
[1]Korea Institute of Industrial Technology, Korea, [2]Pusan National University, Korea

4-0659 The Effect of Wear Resistance in Accordance with PTFE & MoS2 Layer Formed on the Surface of SCM440
Kyoung Il Moon, Hyun Jun Park
Korea Institute of Industrial Technology, Korea

4-0663 Chemical and Mechanical Properties of Different Condition in DLC Coatings on Plasma Nitrided AISI 4140 Alloy Steel
Bum Soo Kim[1], Hyun Jun Park[1], Sang Sub Kim[2], Kyoung Il Moon[1]
[1]Korea Institute of Industrial Technology, Korea, [2]Inha University, Korea

4-0682 Interpreting LME Sensitivity by Fe-Zn Reaction: Effect of Zn Coating Process
Doyub Kim[1], Jee-Hyun Kang[1], Du-Youl Choi[2], Sung-Joon Kim[1]
[1]Pohang University of Science and Technology, Korea, [2]POSCO, Korea

4-0722 The Mechanical Properties Mo-Cu-X(X=Si, Zr, Ti)-N Coatings Sunthesized by Magnetron Sputturing Process with Single Alloying Targets
Hun Jung[1,2], Han Chan Lee[1], Hae-Won Yoon[1], Se Pil Oh[1,2], Paik Kyun Shin[2], Koung Il Moon[1]
[1]Korea Institute of Industrial Technology, Korea, [2]Inha University, Korea

4-0743 A Study on the Mechanical Properties of the AlCr Based Alloy Produced by Spark Plasma Sintering Method
Se Pil Oh[1,2], Han Chan Lee[1], Hae-Won Yoon[1], Hun Jung[1,2], Paik Kyun Shin[2], Koung Il Moon[1]
[1]Korea Institute of Industrial Technology, Korea, [2]Inha University, Korea

4-0810 Minimum Content of Titanium for the Formation of Acicular Ferrite Microstructure
Ka Hee Kim[1,4], Hee Jin Kim[2], G. M. Evans[3], Yongho Choa[4], Kum-hee Seo[5]
[1]Korea Advanced Nano Fab Center, Korea, [2]Korea Institute of Industrial Technology, Korea, [3]Consultant, UK, [4]Hanyang University, Korea, [5]Korea University of Technology and Education, Korea

4-0834 Study on Alloy Composition Optimization for Cu-Ni-Si Based upon Orthogonal Design
Feng Huang, Jingjing Wang, Qian Hu, Jing Liu
Wuhan University of Science and Technology, China

4-0836 Effects of Gnps Loaded on Anticorrosive Performance of Zinc-Rich Coatings
Xiangkang Cao, Feng Huang, Jiao Zhang, Jing Liu
Wuhan University of Science and Technology, China

5. Forming and shaping

16:00-18:00, November 20 (Tue) *Lobby (2F)*

Chairs Murali Tumuluru (U. S. Steel, USA)
Sukkyu Lee (POSCO Technical Research Laboratories, Korea)
Shi Hoon Choi (Suncheon National University, Korea)

5-0457 Correlation between Fracture Initiation Energy and Stretch-Flangeability of Sheet Metals
Jae Ik Yoon, Jaimyun Jung, Hyoung Seop Kim
Pohang University of Science and Technology, Korea

5-0648 Springback Analysis of Transformation-Induced Plasticity Steels
Jaebong Jung[1], Sungwook Jeon[1], Hyun-Seok Lee[2], Byung-Min Kim[1], Ji Hoon Kim[1]
[1]Pusan National University, Korea, [2]NARA Mold & Die Co., Ltd., Korea

5-0766 New Solution in Improving Homogeneities of Heavy Ingots
Qiaodan Hu, Jun Li, Jianguo Li
Shanghai Jiao Tong University, China

5-0781 Effect of Loading-Unloading Behavior on Springback Prediction in Split-Ring Test
Yumi Choi, HongJin Choi, Kijung Lee, Myoung-Gyu Lee
Seoul National University, Korea

5-0826 Crack Formation Mechanism in the Punching Process of Hot-Rolled High Tensile Strength Steel Sheet
Kazuhiko Yamazaki[1], Takehiro Okano[2], Chikara Inoue[2], Sota Goto[1], Yoshihiko Ono[1], Shinsuke Suzuki[2]
[1]JFE Steel Corporation, Japan, [2]Waseda University, Japan

6. Hydrogen embrittlement

16:00-18:00, November 20 (Tue) *Lobby (2F)*

Chairs Wolfgang Bleck (RWTH Aachen University, Germany)
Christopher Hutchinson (Monash University, Australia)
Jer-Ren Yang (National Taiwan University, Taiwan)

6-0168 Effect of Ni and Mn on Austenitic Stability and Hydrogen Embrittlement Susceptibility in Austenitic Stainless Steels
Han-Seop Noh[1], Jee-Hyun Kang[1], Kwang-Min Kim[2], Sung-Joon Kim[1]
[1]Pohang University of Science and Technology, Korea, [2]POSCO, Korea

6-0400 Microstructural Aspects of Hydrogen Embrittlement for YS 550MPa Grade FCA Steel Welds
Hanji Park[1], In Kim[2], Dae-Geun Nam[3], Namhyun Kang[1]
[1]Pusan National University, Korea, [2]Hyundai Steel Company, Korea, [3]Korea Institute of Industrial Technology, Korea

6-0626 Influence of Chloride to Hydrogen Entry into Stainless Steel
Takehiro Okutani, Hiroyuki Saito
Tokyo Denki University, Japan

6-0837 Effect of Submicron-Scale MnS Inclusions on Hydrogen Trapping and HIC Susceptibility of X70 Pipeline Steels
Zhixian Peng, Jing Liu, Feng Huang, Qian Hu
Wuhan University of Science and Technology, China

7. Computational modeling

16:00-18:00, November 20 (Tue) *Lobby (2F)*

Chairs Harry Bhadeshia (University of Cambridge, UK)
Matthias Militzer (The University of British Columbia, Canada)
Takahito Ohmura (National Institute for Materials Science, Japan)

7-0152 Numerical Simulation of Physical Field in a Continuous Hot-dip Galvanizing Bath
Jianfeng He
Baosteel, China

7-0237 Plastic Deformation Capacity of Short-span H-shaped Beams under Reversed Axial Forces
Kanako Abe[1], Atsushi Suzuki[1], Yoshihiro Kimura[1], Kazuhiko Kasai[2]
[1]Tohoku University, Japan, [2]Tokyo Institute of Technology, Japan

7-0358 Phase Field Based Recrystallization Model to Predict the Influence of Stored Energy Distribution and Annealing Schedule on C-Mn Steel
Akash Bhattacharjee, Gerald Tennyson
TCS Research, India

7-0385 Prediction of Martensitic Transformation – A Phase-Field Method
Kyeong-Min Kim, Jae-Sang Lee, Byeong-Joo Lee
Pohang University of Science and Technology, Korea

7-0466 Feasibility Constraint for Materials Related Optimization Problems
Jaimyun Jung, Jae Ik Yoon, Hyoung Seop Kim
Pohang University of Science and Technology, Korea

7-0529 Modeling the Recyrstallization Texture for a Nongrain Oriented Electrical Steel Using the Strain Energy Release Maximization Theory
Hak Hyeon Lee[1], Jaimyun Jung[1], Jae Ik Yoon[1], Jae-Kyoum Kim[2], Hyoung Seop Kim[1]
[1]Pohang University of Science and Technology, Korea, [2]POSCO, Korea

7-0653 Non-Uniform Distribution and Thermal Behavior of Mold Flux and Air Gap in Continuous Casting Mold
Xudong Wang
Dalian University of Technology, China

7-0667 Numerical Simulation of Carbon Concentration-Depth Profile in Low-Pressure Carburized Steels
Gi Hoon Kwon[1, 2], Minsu Jung[1], Kyoung Il Moon[1], Sang Sub Kim[2]
[1]Korea Institute of Industrial Technology, Korea, [2]Inha University, Korea

7-0761 Thermodynamics Analysis for the Magnetic-Field-Induced Precipitation Behaviours in Steels
Zihua Li, Tingping Hou, Yu Wang, Kaiming Wu
Wuhan University of Science and Technology, China

8. Advanced characterization

16:00-18:00, November 20 (Tue) *Lobby (2F)*

Chairs Harry Bhadeshia (University of Cambridge, UK)
Matthias Militzer (The University of British Columbia, Canada)
Takahito Ohmura (National Institute for Materials Science, Japan)

8-0131 Usage of Granulated Mold Flux to Increase of Casting Speed of Low Carbon Steel
Masoud Al-Gahtani[1], Sunilkumar Pillai[2]
[1]Hadeed R&T, Saudi Arabia, [2]Hadeed Steel Plant, Saudi Arabia

8-0327 Effects of Precipitates on Hydrogen Permeation Behavior in ULC Steels
L.J. Chiang, J.F. Tu, K.C. Yang, W.J. Cheng, C.Y. Huang
China Steel Corporation, Taiwan

8-0484 Study on Secondary Recrystallization Behavior of High Permeability High-temperature Slab Reheating Grain-oriented Silicon Steel Containing Bi
Jiaxin Yang
National Engineering Research Centre for Silicon Steel, China

8-0633 Effect of Ferrite/Cementite Interface Character on Yielding Behavior Investigated by SEM/EBSD, HR-TEM, Nanoindentation, and Diffraction Using Neutron and Synchrotron X-ray
Yanxu Wang, Yo Tomota, Takahito Ohmura
National Institute for Materials Science, Japan

8-0646 A Study on the Mechanical Properties of Boron Steel Treated by Different Atmosphere on the Continuous Heat Treatment Furnace
Hyun Jun Park[1], Sangsub Kim[2], Kyoung Il Moon[1]
[1]Korea Institute of Industrial Technology, Korea, [2]Inha University, Korea

8-0851 Interactions between Dislocations and Grain Boundary Investigated by STEM and Nanoindentation in BCC Bicrystals
Ya-Ling Chang, Seiichiro Ii, Takahito Ohmura
National Institute for Materials Science, Japan

8-0882 Nanoindentation Study on the Contributions of Constituent Layers to the Global Strength and Ductility of a Multi-Layered Steel
Moo-Young Seok[1], Guanghui Yang[2], Jeong-Min Park[2], Dong-Hyun Lee[1], Shoichi Nambu[3], Toshihiko Koseki[3], Jae-il Jang[2]
[1]Max-Planck-Institut für Eisenforschung GmbH, Germany, [2]Hanyang University, Korea, [3]The University of Tokyo, Japan

NOTE

NOTE

Niobium Technology: lower CO_2 emissions

Niobium alloying increases high temperature resistance in ferritic stainless steels, prolonging the life of car exhaust systems. Improved component lifecycles mean more efficient use of resources – less steel, lower CO_2 emissions.

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- **안전을 위한 강도의 혁신 :** 1㎠당 10톤의 하중을 견디는 1GPa급 강도
- **연비를 위한 무게의 혁신 :** 기존 차체 대비 26.4% 경량화

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- **안전을 위한 강도의 혁신 :** 1㎠당 10톤의 하중을 견디는 1GPa급 강도
- **연비를 위한 무게의 혁신 :** 기존 차체 대비 26.4% 경량화

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