Symposium A : Advanced Steels and Properties

November 20 (Mon.), 2023

Session Title : Advanced Steels and Properties 1
Time : 10:50 - 12:30, Nov. 20
Room # : Halla Hall A, 3F
Session Chair : Byoungchul Hwang, Seoul National University of Science and Technology

10:50 – 11:20 Keynote **K-A0337**

Mechanisms of dislocation multiplication and nano-twin formation in a thermally cycled Fe-17Mn alloy

Young-Kook Lee, Yonsei University, Korea

11:20 – 11:40 Invited **I-A0858**

Negative strain-rate sensitivity in advanced high-strength steel: Critical role of carbon

Mingxin Huang, University of Hongkong, China

11:40 – 12:00 Invited **I-A0114**

Strengthening contributions of dislocations and twins in warm-rolled TWIP steels

Yizhuang Li, Northeastern University, China

12:00 – 12:15 **O-A1012**

DSA-induced twinning in a ferritic low-density steel

Mahdi Aghaahmadi, Hanbat National University, Korea

12:15 – 12:30 **O-A0264**

Characterization of serration behavior in transformation-induced plasticity (TRIP) steels by digital

Myeong-heom Park, Kyoto University, Japan

Session Title : Advanced Steels and Properties 2
Time : 14:00 - 15:25, Nov. 20
Room # : Halla Hall A, 3F
Session Chair : Jeongho Han, Hanyang University

14:00 – 14:30 Keynote **K-A0337**

Recent trend on development of automotive high strength steels and their contribution toward carbon neutral society

Naoki Yoshinaga, Nippon Steel Corporation, Japan

14:30 – 14:50 Invited **I-A0642**

Microstructural design and abrasive wear behaviour of self-reinforcing high abrasion resistant steels with low hardness

Xiaojun Xu, Southwest Jiaotong University, China

14:50 – 15:10 **Invited** **I-A0527**

Microstructure control of cold-rolled DP steel sheet for high ductility considering Mn partitioning during intercritical annealing

Tatsuya Nakagaito, JFE Steel Corporation, Japan

15:10 – 15:25 **O-A1138**

Application of chemical heterogenous designing strategy on a novel maraging stainless steel

Geng Liu, Central Iron & Steel Research Institute Limited, China

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Session Title : Advanced Steels and Properties 3
Time : 16:00 - 17:50, Nov. 20
Room # : Halla Hall A, 3F
Session Chair : Sophie Primig, The University of New South Wales

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16:00 – 16:30 **Keynote** **K-A**

Peter Hodgson, Deakin University, Australia

16:30 – 16:50 **Invited** **I-A1026**

A Novel Hot Work Die Steel Breaking Through the Contradiction between Strength and Thermal

Hongliang Yi, Northeastern University, China

16:50 – 17:05 **O-A0327**

The study of the damage mechanism of dual-phase steel using in-situ X-ray Computed Tomography (XCT)

Abdulwahab Qarooni, University Of Tokyo, Japan

17:05 – 17:20 **O-A0119**

Analysis of martensitic transformation of metastable austenitic stainless steel during electrochemical polishing

JunYoung Chae, Seoul National University, Korea

17:20 – 17:35 **O-A0273**

Multi-aspect Characterization of Low-temperature Tempering Behaviors in High-carbon Martensite.

Yongjie Zhang, Tohoku University, Japan

17:35 – 17:50 **O-A0290**

Three-dimensional configuration of deformation in stainless steel assessed by high resolution

digital image correlation and confocal microscopy

Wujun Yin, The University of Tokyo, Japan

November 21 (Tue.), 2023

Session Title : Advanced Steels and Properties 4
Time : 10:50 - 12:30, Nov. 21
Room # : Halla Hall A, 3F
Session Chair : Hao Chen, Tsinghua University

10:50 – 11:20 **Keynote** **K-A0164**

Microalloyed cold-rolled advanced high strength steels

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

11:20 – 11:40 **Invited** **I-A0485**

Designing microstructures in low carbon microalloyed steels

Arnab Chakraborty, The University of New South Wales, Australia

11:40 – 12:00 **Invited** **I-A0500**

Ultra-high strength hot-forged lightweight steels

Seok Su Sohn, Korea University, Korea

12:00 – 12:15 **O-A0187**

Processing-microstructure-property relationship in governing high strength-high ductility combination in Fe-4Mn-4Ni-3Al-0.1C steel

Linfeng Zhang, Hiroshima University, Japan

Session Title : Advanced Steels and Properties 5
Time : 14:00 - 15:15, Nov. 21
Room # : Halla Hall A, 3F
Session Chair : Jinkyung Kim, Hanyang University ERICA

14:00 – 14:20 **Invited** **I-A0468**

Hydrogen-assisted crack and embrittlement behavior of medium-Mn steels

Jeongho Han, Hanyang University, Korea

14:20 – 14:40 **Invited** **I-A1041**

Microstructural path and mechanisms of hydrogen-assisted fatigue crack growth of tempered martensitic steels with different tensile strengths

Motomichi Koyama, Tohoku University, Japan

14:40 – 15:00 **Invited** **I-A0382**

Atom probe tomography of hydrogen trapping mechanism in carbide-strengthened steels

Yi-Sheng (Eason) Chen, The University of Sydney, Australia

15:00 – 15:15 **O-A1158**

First-principles study on the P-induced embrittlement and de-embrittling effect of B and C in ferritic steels

Jingliang Wang, University of Science and Technology Beijing, China

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Session Title : Advanced Steels and Properties 6

Time : 16:00 – 17:25, Nov. 21

Room # : Halla Hall A, 3F

Session Chair : Motomichi Koyama, Tohoku University

16:00 – 16:20 **Invited** **I-A0865**

Overcoming the strength-ductility trade-off in metastable dual-phase heterogeneous structures using variable temperature rolling and annealing

Wei Xu, Northeastern University, China

16:20 – 16:40 **Invited** **I-A0694**

Hydrogen trapping role of nano austenite transformed from metastable carbide in high strength steel

Yuantao Xu, Shanghai Jiao tong University, China

16:40 – 16:55 **O-A0333**

Variation of tensile elongation degradation with grain size in a hydrogen-charged metastable high Mn

Mohammad Moallemi, Pohang University of Science and Technology, Korea

16:55 – 17:10 **O-A0375**

Hydrogen embrittlement in additively manufactured ultra-high strength maraging steels: from mechanistic understanding to H-tolerant structure design

Shiqi Zhang, Wuhan University of Science and Technology, China

17:10 – 17:25 **O-A0736**

Immersion-type hydrogen charging on a high strength martensitic steel with Zn-coating

Ju-Hyun Baek, Korea University, Korea

November 22 (Wed.), 2023

Session Title : Advanced Steels and Properties 7
Time : 10:50 - 12:30, Nov. 22
Room # : Halla Hall A, 3F
Session Chair : Yoon-Uk Heo, Pohang University Of Science And Technology

10:50 – 11:20 Keynote K-A0817

The effect of boundaries on the toughness in a high strength low alloy structural steel

Chengjia Shang, University of Science and Technology Beijing, China

11:20 – 11:40 Invited I-A0787

An original unified approach for the description of phase transformations in steel during cooling

Olivier Bouaziz, University of Lorraine, France

11:40 – 12:00 Invited I-A0686

Deformation microstructure of pearlitic steel at different conditions

Rintaro Ueji, National Institute for Materials Science, Japan

12:00 – 12:15 O-A0418

Comparative study on the role of the grain boundary segregation of phosphorus and sulfur on the hot ductility in low-carbon steel

Soohyun Kim, Graduated Institute of Ferrous & Materials Technology, POSTECH, Korea

12:15 – 12:30 O-A0030

Strengthening-Toughening Mechanism of Nitrogen-Containing AISI H13 Steel

Jie Zhou, Shougang Group, China

Session Title : Advanced Steels and Properties 8
Time : 14:00 - 15:45, Nov. 22
Room # : Halla Hall A, 3F
Session Chair : Xuejun Jin, Shanghai Jiao Tong University

14:00 – 14:30 Keynote K-A0373

Mechanical Property Analysis of High Strength Steels by Neutron Diffraction Experiments

Noriyuki Tsuchida, University of Hyogo, Japan

14:30 – 14:50 Invited I-A0605

Understanding of liquid metal embrittlement cracks (LME) in Zn-coated resistance spot welding : Electrode contact and nugget growth for stress development and cracking

Yeong-Do Park, Dong-Eui University, Korea

14:50 – 15:10 Invited I-A0232

Microstructural characterization using advanced small-angle scattering

Yojiro Oba, Toyohashi University of Technology, Japan

15:10 – 15:30 **Invited** **I-A0794**

Toughening ultrastrong steel by textured δ-ferrite lamellas

Haiwen Luo, University of Science and Technology Beijing, China

15:30 – 15:45 **O-A1167**

Prior austenite refinement route and precipitation regulation for 1 GPa grade high-strength high toughness low alloy steel

Zhenjia Xie, University of Science and Technology Beijing, China

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Session Title : Advanced Steels and Properties 9-1

Time : 16:00 – 18:00, Nov. 22

Room # : Halla Hall A, 3F

Session Chair : Toshihiro Tsuchiyama, Kyushu University

16:00 – 16:20 **Invited** **I-A0752**

Optimisation of Infill Structures in 3D Printed 316L Stainless Steels

Zakaria Quadir, Curtin University, Australia

16:20 – 16:40 **Invited** **I-A0240**

Hybrid additive manufacturing of 316L stainless steel

Wen Hao Kan, The University of Sydney, Australia

16:40 – 17:00 **Invited** **I-A0403**

Extraction of Process–Structure–Property Linkage Using Deep Learning Methods

Junya Inoue, The University of Tokyo, Japan

17:00 – 17:15 **O-A0016**

Sintering Pollutant Reduction Technology Based on Oxygen Redistribution

Wen Pan, Beijing Key Laboratory of Green Recyclable Process for Iron & Steel Production Technology, China

17:15 – 17:30 **O-A0761**

Reoxidation behavior of Al-killed ferritic stainless steel melts: Influence of tundish flux and Ti content

Yeongjin Jun, Hanyang University, Korea

17:30 – 17:45 **O-A0041**

Research on Corrosion Behavior of Weathering Bridge Steel in Simulated Typical Industrial Atmospheric Environment of Chemical Plant

Sha Kaizhi, State Key Laboratory of Metal Material for Marine Equipment and Application, China

17:45 – 18:00 **O-A0835**

Advancing mechanism of oxide/matrix interface for the internal oxidation of austenitic stainless steel in liquid lead-bismuth eutectic

Chengxu Lu, Institute of Metal Research, Chinese Academy of Sciences, China

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Session Title : Advanced Steels and Properties 9-2

Time : 16:00 – 18:00, Nov. 22

Room # : 303B, 3F

Session Chair : Yoshikazu Todaka, Toyohashi University of Technology

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16:00 – 16:15 **O-A0022**

The effect of Co and Cu on grain growth kinetics in ferritic/martensitic heat-resistant steels

Bong Cheon Park, Korea Institute of Material Science, Korea

16:15 – 16:30 **O-A0857**

Transition of deformation mode from dislocation slip to martensite transformation with grain refinement in an austenitic stainless steel

Dapeng Yang, Northeastern University, China

16:30 – 16:45 **O-A0301**

Relation between misorientation of prior austenite grain boundary (PAGB) and hydrogen-induced crack propagation path

Ji Hoon Kim, Tohoku University, Japan

16:45 – 17:00 **O-A0149**

Exploring the Impact of Grain Boundary Character Distribution on the Hall-Petch Relationship in Austenitic Stainless Steel, SUS316L

Misato Nakajima, Kumamoto University, Japan

17:00 – 17:15 **O-A0034**

The influence of pre-plating on the LME phenomenon during spot-welding of DH780 advance high strength steel

Xue Bai, Shougang Group Co., Ltd, China

17:15 – 17:30 **O-A0942**

Impact of Post Weld Heat Treatment on Stress Relaxation Cracking in 347H Weldments

Zhenzhen Yu, Colorado School Of Mines, USA

17:30 – 17:45 **O-A1121**

Direct 3D Atomic-Scale Insights into Weak and Strong Hydrogen Trapping Sites in High-

strength Cold-drawn Steels

Chao Huang, The University of Sydney, Australia

November 23 (Thurs.), 2023

Session Title : Advanced Steels and Properties 10-1
Time : 9:00 – 10:30, Nov. 23
Room # : Halla Hall A, 3F
Session Chair : Nokeun Park, Yeungnam University

09:00 – 09:15 **O-A0792**

The effect of austenite size and shape on its mechanical stability in advanced high strength steels (AHSS)

Jie Luo, Monash University, Australia

09:15 – 09:30 **O-A0027**

The abnormal carbon redistribution in lath martensite during tempering in Mn-patterned steels

Dezhen Yang, Beijing Institute of Technology University, China

09:30 – 09:45 **O-A0097**

Acceleration of bainitic transformation in a 0.28C – 3.8Mn – 1.5Si steel using chemical heterogeneity

Ji Hoon Kim, Tohuko University, Japan

09:45 – 10:00 **O-A0601**

Enhancing the Mechanical Performance of Resistance Spot Welds of Hot-Stamped Boron-Alloyed Steels by Paint Baking Treatment

Sunusi Manladan, Dong-Eui University, Korea

10:00 – 10:15 **O-A0212**

Development of Al-10% Si coated 1.8 GPa TWB Hot Stamped Parts in Car Body Application

ChangWook LEE, Hyundai Motor Company, Korea

10:15 – 10:30 **O-A0593**

Microstructural evolution during tempering in an ultra-high strength steel strengthened by coexisting nanoprecipitates

Haofei Zhu, Beijing Institute of Technology, China

Session Title : Advanced Steels and Properties 10-2
Time : 9:00 – 10:30, Nov. 23
Room # : 303B, 3F

Session Chair : Seok Su Sohn, Korea University

09:00 – 09:15 **O-A0364**

In-situ ECCI of Dislocation Structure Evolution during Plastic Deformation in Lath Martensite of Low-Carbon-Steel

Shuang Gong, The University of Tokyo, Japan

09:15 – 09:30 **O-A0613**

Effect of cooling rate on the improvement of tensile properties in a Fe-Mn-Si-C-based multi-phase TRIP steels

Chang-Gon Jeong, Pohang University of Science and Technology, Korea

09:30 – 09:45 **O-A0421**

Intercritical Austenitizing, Room Temperature Quenching, Tempering and Partitioning (IA-Q-T&P): Enhancing Yield Strength and Preventing Plastic Instability

Juhua Liang, Hefei Institutes of Physical Science, Chinese Academy of Sciences, China

09:45 – 10:00 **O-A0472**

Role of cementite during austenitization in auto-tempered 0.15C-5Mn martensitic steel

Jungwoong Kim, Pohang University of Science and Technology, Korea

10:00 – 10:15 **O-A0035**

Restraining plastic instability of intercritically annealed 7Mn medium-Mn steel via pre-water quenching

Mei ZHANG, Shanghai University, China

Session Title : Advanced Steels and Properties 11-1
Time : 10:50 – 12:35, Nov. 23
Room # : Halla Hall A, 3F
Session Chair : Nam Hoon Goo, Pohang University of Science and Technology

10:50 – 11:05 **O-A0046**

Tailoring austenite stability and mechanical behaviors via compositional core-shell structure in advanced high strength steels

Shichun Liu, Tsinghua University, China

11:05 – 11:20 **O-A0477**

The effect of pre-strains on the temperature and deformation-induced martensitic transformation in austenitic steels

Lingyu Wang, Northeastern University, China

11:20 – 11:35 **O-A0281**

Crystallographical characteristics of deformation-induced martensite transformation in ultrafine grained metastable austenitic steel

Yuanhong LIU, Kyoto University, Japan

11:35 – 11:50 **O-A0326**

Identification of Fatigue Properties and Deterioration Mechanism in the Repeated Earthquake and Fire Situation

Jae-Yeon Han, Changwon National University, Korea

11:50 – 12:05 **O-A0196**

Controlling of Crystallography and Incomplete Transformation Characteristics in A Low-Carbon Low-Alloy Steel

Binbin Wu, Harbin Engineering University, China

12:05 – 12:20 **O-A0332**

Investigation of Low-Cycle Fatigue Deformation Behavior Based on Dislocation in FeMnAlC Lightweight Steel for Low-Pressure Turbine Blade at RT/200 °C

Si Yeon Kim, Changwon National University, Korea

12:20 – 12:35 **O-A1135**

Unveiling the Mechanisms behind Texture Gradient Formation and its Impact on Torsional Performance of Steel Wires

Chunni Jia, Chinese Academy of Science, China

Session Title : Advanced Steels and Properties 11-2
Time : 10:50 – 12:35, Nov. 23
Room # : 303B, 3F
Session Chair : Jae Sang Lee, Pohang University of Science and Technology

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10:50 – 11:05 **O-A0194**

Investigation of tensile and fatigue properties of 316L stainless steel at 20K

Chetan Singh, Chungnam National University, Korea

11:05 – 11:20 **O-A0009**

Development of hot dip galvanized TBF steel with a tensile strength of 980MPa

Yinghua Jiang, Research Institute of Technology, Shougang Group Co., Ltd, Korea

11:20 – 11:35 **O-A0764**

Cyclic deformation behavior of high manganese steels at ultra-low temperature

SUJITH S V, Chungnam National University, Korea

11:35 – 11:50 **O-A0077**

Effect of Tempering Temperature on Microstructure and Mechanical and Magnetic Properties of Ultra-High Strength Rim Sheet Steel

Chang Song, Baosteel Central Research Institute, Wuhan Iron & Steel Co., Ltd., China

11:50 – 12:05 **O-A0079**

Influence of Cooling Parameters on Precipitation of Grain Boundary Cementite of 0.92%C Steel Wire Rods

Hang Gao, Ansteel Group, China

12:05 – 12:20 **O-A0088**

Effect of Different Heat Treatment Temperatures on Microstructure and Precipitated Phase in Advanced High Strength Steel

Wang Bo, Hebei University of Science and Technology, China

12:20 – 12:35 **O-A0117**

A Comprehensive Study of HER in Complex Phase and Martensitic Steels: Understanding the Role of Punching Damage

Cho Woojin, Seoul National University, Korea

Session Title : Advanced Steels and Properties 12
Time : 14:00 – 15:30, Nov. 23
Room # : Halla Hall A, 3F
Session Chair : Jeongho Han, Hanyang University

14:00 – 14:15 **O-A0019**

Microstructures and mechanical properties of a Ti-microalloyed High-strength steel subjected to quenching-tempering process

Fanzheng Bu, TKAS Auto Steel Company Limited, China

14:15 – 14:30 **O-A0033**

Effect of Heat Treatment on Microstructure and Properties of Hot Rolled Mn-Cu Based Damping Alloy

Yao Huang, Harbin Engineering University, China

14:30 – 14:45 **O-A0150**

Quenching and partitioning in a Si/Al-free steel realized by Mn patterning

Zhiping Xiong, Beijing Institute of Technology, China

14:45 – 15:00 **O-A0172**

Engineering chemical heterogeneity via fast heating to achieve strong yet ductile medium Mn steels

Yan Wang, Tsinghua University, China

15:00 – 15:15 **O-A0209**

Effect of Post-Heat Treatment on Microstructure and Mechanical Properties of 5% Cr Cold Work Tool Steel Manufactured Via Laser Direct Energy Deposition

Jung-Hyun Park, Inha University, Korea

15:15 – 15:30 **O-A1166**

Visualization of welding microstructure of high-strength bainitic steel and its relationship with ductile-brittle transition temperature (DBTT)

Xuelin Wang, University of Science and Technology Beijing, China