

**The timetable the 179th ISIJ Meeting
(March 17–19, 2020 at Tokyo Institute of Technology, Ookayama Campus)**

Session Room	Mar. 17 (Tue.)		Mar. 18 (Wed.)		Mar. 19 (Thu.)	
	AM	PM	AM	PM	AM	PM
Session Room 1 South Bldg.2 2nd fl. S222	---	---	Processes of iron ore treatment for increasing resource flexibility and resolving environmental problem in the future [D1-D10] (9:00-16:15)		---	---
Session Room 2 South Bldg.2 2nd fl. S221	Thermodynamics [1-5] (10:00-11:40)	---	---	Young engineer session of coke-making/Coal and coke [28-35] (13:00-15:50)	ISIJ and JIM joint session Physico-chemical properties of high temperature melts 1·2·3·4 [J30-J42] (9:30-15:30)	
Session Room 3 South Bldg.4 2nd fl. S421	Electromagnetic processing of materials [6-10] (10:00-11:40)	---	Introduction of research topics in novel processing forum/ Novel processing [36-41] (9:30-11:40)	Transport phenomena [42-44] (13:00-14:00)	Slag 1·2 [77-83] (9:00-11:30)	---
Session Room 4 South Bldg.6 2nd fl. S621	Blast furnace operation/Control of thermal status in blast furnace hearth/Young engineer session of ironmaking [11-19] (9:00-12:20)	---	Hot metal Pretreatment [45-49] (10:00-11:40)	Converter/ Secondary refining/Inclusion [50-58] (13:30-16:50)	Formation, growth, and variation of inclusion through steel production route 1·2 [84-90] (9:30-12:00)	---
Session Room 5 South Bldg.6 2nd fl. S622	Agglomeration processes/ Structure analysis of sinter [20-27] (9:40-12:30)	---	Continuous casting and solidification 1·2 [59-66] (9:00-11:50)	Continuous casting and solidification 3/ Multi-scale analysis of solidification structures, segregation, inclusion and casting defects 1·2 [67-76] (13:20-17:00)	---	---
Session Room 6 South Bldg.7 2nd fl. 202	---	---	Slag [91-94] (9:30-10:50)	Thermal utilization/ Anti-fouling and -scaling [95-103] (13:50-17:00)	---	---
Session Room 7 South Bldg.4 2nd fl. S423	---	---	---	Effective utilization of steelmaking slag as the largest secondary resource of phosphorus in Japan (13:00-17:15) [1,000yen]	Current technologies and issues toward achievement of low carbon and energy saving ferrous metallurgy process/ Emerging key technologies to abate CO ₂ emission from iron-making processes [104-109] (9:30-11:40)	Present maintenance situation of aging infrastructures IV (13:00-16:30) [Charge-free]
Session Room 8 South Bldg.4 2nd fl. S422	---	---	Instrumentation [110-113] (10:20-11:40)	Control/System [114-120] (13:40-16:10)	Recent measurement technology and its challenge of microstructure formation, property determination, quality assurance and process control of materials (9:00-12:00) [Charge-free]	---
Session Room 9 South Bldg.2 2nd fl. S224	Flow stress and mathematical modeling 1·2 [121-126] (9:20-11:30)	---	Manufacturing technology of high quality and high functional bar and wire [127-129] (10:40-11:40)	Ductile fracture: mechanisms, origin, effects & control [D11-D15] (13:15-16:05)	Cooling/Cooling and scale [135-141] (9:00-11:30)	Bonding and fracture 1·2 [142-147] (13:00-15:10)
Session Room 10 South Bldg.2 2nd fl. S223	---	---	Rolling and lubrication [130-134] (10:00-11:40)	Needs for tubes with uneven thickness and their manufacturing and forming techniques [D16-D23] (13:00-16:40)	---	17th ISIJ-JSSC Joint Symposium (13:00-16:05) [Member 2,000yen Non member 3,000yen]
Session Room 11 Main Bldg. Basement H101	Advances in property characterization based on microstructural analysis using quantum beam (9:25-17:00) [Charge-free]		---	Aging and precipitation/ Martensite transformation 1 [166-175] (13:00-16:30)	Martensite transformation 2 [242-245] (9:00-10:20)	Recrystallization and texture [246-250] (13:00-14:40)
Session Room 12 Main Bldg. Basement H103	Modeling and simulation 1·2 [148-153] (9:50-12:00)	---	Electrical steel [176-178] (10:00-11:00)	Toward understanding of corrosion-induced hydrogen absorption to steels in air-Part 3 (13:00-17:00) [Charge-free]	---	---
Session Room 13 Main Bldg. 1st fl. H114	Stainless steels 1·2 [154-161] (9:00-11:50)	---	ISIJ and JIM joint session Ultrafine grained materials -fundamental aspects for ultrafine grained structures- 1·2·3 [J19-J29] (9:00-14:00)		Diffusional transformation 1·2 [179-187] (14:10-17:20)	---
Session Room 14 Main Bldg. 1st fl. H111	---	---	---	Plate and sheet products/ Machine structural steel 1·2 [188-196] (13:00-16:20)	Steel informatics 1 [251-255] (10:00-11:40)	Steel informatics 2 [256-260] (13:00-14:40)
Session Room 15 Main Bldg. 2nd fl. H121	---	Micro-analysis of corrosion phenomena on stainless steels (13:00-16:00) [Charge-free]	Hydrogen embrittlement 1·2 [197-203] (9:20-11:50)	Hydrogen embrittlement 3·4·5 [204-213] (13:00-16:40)	Hydrogen embrittlement 6·7 [261-268] (9:10-12:00)	---
Session Room 16 Main Bldg. 3rd fl. H136	Segregation [162-165] (10:00-11:20)	---	Toughness and fracture/Fatigue [214-220] (9:00-11:30)	Hot-dip coating/Chemical property [221-229] (13:00-16:10)	---	---
Session Room 17 Main Bldg. 3rd fl. H135	---	---	Heat resistant steels and alloys 1 [230-233] (10:30-11:50)	Heat resistant steels and alloys 2·3 [234-241] (13:00-15:50)	Strength and deformation behavior 1 [269-272] (10:40-12:00)	Strength and deformation behavior 2·3 [273-279] (13:00-15:30)
Session Room 18 Main Bldg. 1st fl. H112	Crystal structure analysis [280-282] (10:00-11:00)	---	Artifacts in steel analysis [283-287] (10:00-11:40)	Precipitate and inclusion analysis/Elemental analysis 1·2 [288-296] (13:00-16:20)	Current developments in nondestructive analysis using synchrotron radiation, neutron, and muon -Towards application of cultural heritage research- [Int.-1-Int.-12] (10:00-16:20)	
JIM Session Room C West Bldg. 3 3rd fl.	---	---	ISIJ and JIM joint session Titanium and its alloys 1·2·3·4·5 [J1-J18] (9:00-16:40)		---	---
Ceremony of confement of the honorary membership and prize awarding. Special lecture meeting (13:15-17:15 Tokyo Institute of Technology 70th Anniversary Auditorium) Banquet (18:30-20:30 HAPPO-EN Main Bldg. 3rd fl.) [12,000yen]			Poster Session for Students (12:00-16:00 Tokyo Tech Front 1st fl. Kuramae Hall) ISIJ Beer Party (17:30-19:00 Student Hall & Cafeteria First Canteen 1st fl.) [1,000yen]			

[] : Lecture Number
() : Lecture Time
■ : Symposium: Please ask to each of symposium room desks directly

Program of the 179th ISIJ Meeting (March 17-19, 2020)

Discussion Sessions

High Temperature Processes

Lecture No.	Title	Speaker	Page
Processes of iron ore treatment for increasing resource flexibility and resolving environmental problem in the future			
9:00-9:20			
D1	Sintering process for increasing resource flexibility and resolving environmental problems	T. Murakami	1
9:20-9:55			
D2	Effect of particle size of fine Hematite on characteristics and strength of quasi-particle	T. Maeda	3
9:55-10:30			
D3	Numerical simulation of granulation of fine iron ore particles	H. Nakamura	5
10:40-11:15			
D4	Influence of oxygen concentration and particle size on the combustion rate of coke and biomass char	A. Nakamura	8
11:15-11:50			
D5	Acceleration of oxidation of iron bearing materials together with carbonaceous materials in sintering process	Y. Konno	10
13:10-13:45			
D6	Analysis of the change of packed bed structure due to melt transfer between different types of granules	S. Ishihara	12
13:45-14:20			
D7	Effect of iron ore type and gangue components on strength and texture of fine powder granule	S. Nakamura	14
14:30-14:55			
D8	Effect of coarse pellet mixing ratio at bottom layer on sintering properties (Secretary studies in research group of sintering technology harmonized with iron resource and environment -1)	K. Miyagawa	16
14:55-15:20			
D9	Mixed charging effect of green pellet and bonding agent to bottom layer on sintering properties (Secretary studies in research group of sintering technology harmonized with iron resource and environment-2)	T. Higuchi	18
15:20-15:45			
D10	Elongation effect of high temperature zone in sintering bed at coexistence of biomass char and coke fine (Secretary studies in research group of sintering technology harmonized with iron resource and environment-3)	M. Matsumura	20

Processing for Quality Products

Ductile fracture: mechanisms, origin, effects & control

13:15-13:45			
D11	Identification of flow stress and ductile fracture parameters with tensile test using image analysis and optimization technology	Y. Yoshida	22
13:45-14:15			
D12	Ductile fracture prediction in sheet and bulk metal forming processes by an ellipsoidal void model	K. Komori	26
14:15-14:45			
D13	Prediction of ductile fracture for steel considering stress triaxiality and multi-axis stress state	N. Yukawa	28
14:55-15:25			
D14	Study on evaluation of surface crack in hot forging	H. Kakimoto	30
15:25-15:55			
D15	Effect of rolling condition on ductile fracture at center of billet in piercing rolling	T. Katsumura	34

Needs for tubes with uneven thickness and their manufacturing and forming techniques

13:10-13:50			
D16	Development of tube forming technologies for automotive parts	M. Sato	38
13:50-14:10			
D17	Hydroforming method for providing tubes with thickness distribution in axial direction	A. Shirayori	42
14:10-14:30			
D18	Possibility of locally heat-assisted dieless drawing process for steel tubes	T. Furushima	44
14:30-14:50			
D19	Development of local thickening forming method for metal pipes	T. Kuwabara	46

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15:00-15:20

D20 Manufacturing uneven thickness tube by stretch reducing

H. Yoshimura . . . 49

15:20-15:40

D21 Deformation property in bending process of uneven thickness tube

Y. Saito . . . 52

15:40-16:00

D22 Development of welding technique for steel pipe using cylindrical explosive welding method

A. Mori . . . 54

16:00-16:20

D23 (Invited Lecture) Influence of stress state on material flow of steel tube edge
(Research on tube forging technology with numerical simulation)

Y. Yoshida . . . 56

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International Organized Sessions

Committee for Social Relations with Iron and Steel Sector 2020/3/19 Room18 (Main Bldg. 1st fl. H112)

Current developments in nondestructive analysis using synchrotron radiation, neutron, and muon -Towards application of cultural heritage research-

10:00-10:05

Opening Address: M. Tanaka [Showa Women's Univ.]

Chair: J. Kawai [Kyoto Univ.]

10:05-10:35

Int.-1 (Invited Lecture) Current developments of neutron scattering measurements for steel research

AIST ○Y. Tomota

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10:35-10:55

Int.-2 Archaeometallurgy of Japanese sword using neutron diffraction

JAEA ○S. Harjo · T. Kawasaki, IFAC-CNR F. Grazzi, Showa Women's Univ. M. Tanaka

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10:55-11:25

Int.-3 (Invited Lecture) Comprehensive, neutron-based characterization of cultural heritage objects at the Budapest Neutron Centre, Hungary

Budapest Neutron Centre ○L. Szentmiklosi

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11:25-11:55

Int.-4 (Invited Lecture) The use of neutrons in the study of historical copper alloys and sculpture at the Rijksmuseum

Rijksmuseum ○R. Van Langh

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Chair: A. Sato [Osaka Univ.]

13:00-13:20

Int.-5 Three-dimensional Characterization of MnS Inclusions in Steel by X-ray Micro-CT

Chongqing Univ. ○T. Li · C. Bai, Chinese Academy of Sciences H. Guo

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13:20-13:40

Int.-6 Development of high-energy X-ray microtomography at SPring-8: current status and application to metallic cultural heritage

Japan Synchrotron Radiation Research Institute ○M. Hoshino · K. Uesugi · N. Yagi

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13:40-14:00

Int.-7 Nondestructive study on traditional Japanese swords using synchrotron X-ray CT to clarify the characteristics of sword-making techniques

Showa Women's Univ. ○M. Tanaka, Gifu Prefectural Industrial Technology Center Y. Mizutani, Japan Synchrotron Radiation Research Institute M. Hoshino · K. Uesugi

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14:00-14:30

Int.-8 (Invited Lecture) Combining MA-XRF and OCT in the investigation of the dark background of Vermeer's Girl with a Pearl Earring

Delft Univ. of Technology ○J. Dick

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Chair: Y. Matsui [Kobelco Research Institute]

14:40-15:10

Int.-9 (Invited Lecture) Integration of arts and sciences by using negative muon non-destructive analysis at J-PARC MUSE

High Energy Accelerator Research Organization ○Y. Miyake

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15:10-15:30

Int.-10 Non-destructive elemental analysis of archaeological metal materials using muonic X-rays

Okayama Univ. ○K. Minami, Osaka Univ. A. Sato · K. Ninomiya, International Christian Univ. M. Kubo, Osaka Univ. D. Tomono · Y. Kawashima

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15:30-15:50

Int.-11 Non-destructive identification of carbon content in iron product by muon lifetime measurement

Osaka Univ. ○K. Ninomiya

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15:50-16:10

Int.-12 Development of an in-museum non-destructive elemental analysis with cosmic-ray muons for cultural heritage

Osaka Univ. ○A. Sato

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16:10-16:15

Concluding Remarks: R. Van Langh [Rijksmuseum]

16:15-16:20

Closing Address: K. Nagata [Tokyo Inst. Tech.]

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High Temperature Processes

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3	Measurement of P ₂ O ₅ activity in the CaO-SiO ₂ -FeO _x -P ₂ O ₅ system	K. Moriya	79
4	Aluminum deoxidation equilibrium in molten Fe-Cr-Ni alloy	S. Nakajima	80
5	Phase relation of Fe-Cr-Mn-S and thermodynamic properties of MnS-CrS-FeS system	Y. Lu	81
Electromagnetic processing of materials			
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8	Solute concentration variation with time near solid-liquid interface during the modulated current and magnetic field superimposition	G. Xu	84
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Blast furnace operation			
11	(Tawara Award) Evaluation of coke degradation effect on flow characteristics in packed bed using 3D scanning for rotational mechanical strength test and solid-liquid-gas-fines dynamic model analysis	S. Natsui	87
12	(Nishiyama Commemorative Prize) Recent progress in blast furnace raceway processing technology at Kobe steel ltd.	K. Nozawa	88
13	Selective center coke charging for blast furnace operation	J. Park	89
Control of thermal status in blast furnace hearth			
14	Prediction method of hot temperature in blast furnace	K. Kamo	90
15	Practice on temperature control of hearth of No.1 blast furnace in Baosteel	W. Bo	91
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Young engineer session of ironmaking			
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19	Influence of temperature profile on pore structure of sinter	S. Yamada	95
Agglomeration processes			
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21	(Sawamura Award) <i>In-situ</i> evaluation of crack generation and propagation behaviors of iron ore burdens during low temperature reduction by applying acoustic emission method	M. Mizutani	97
22	Effect of particle size of fine ore on iron oxide granule strength	Y. Yoshitake	98
23	Pellet properties to prevent bursting in pellet manufacturing process	T. Kato	99
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24	(ISIJ Young Researcher Award) Analysis of agglomeration behaviour in sintering bed by X-ray CT	K. Hara	
25	(ISIJ Young Researcher Award) Quantitative analysis of mineral phases in iron-ore sinter by the Rietveld method of X-ray diffraction patterns	T. Takayama	
26	Effects of particle size of magnetite on mineral phase formation of sinter	Z. Wang	100
27	Effects of MgO addition on formation of silico-ferrite of calcium and aluminum (SFCA) in iron ore sinters	M. Hayashi	101
Young engineer session of coke-making			
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29	Measurement of coal surface property by Raman spectroscopy	H. Noma	103
30	Effect of fly ash addition into coal on coke qualities	R. Mitsuyuki	104
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Introduction of research topics in novel processing forum

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Novel processing

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Continuous casting and solidification 1

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60	Effect of C contents on directional solidification of high Si-Mn steel	T. Takayama	• • •	134
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Continuous casting and solidification 2

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65 4D-CT measurement of volume and lattice constant change in Fe-C alloy	T. Suga	• • •	139
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Continuous casting and solidification 3

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70 Improvement of refractory quantity by application of mist injection shot technology to tundish coating material	A. Ishikawa	• • •	144

Multi-scale analysis of solidification structures, segregation, inclusion and casting defects 1

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72 Simulations of microstructural evolution with high-frequency gamma-nucleation around peritectic temperature of Fe-C alloys	J. Ogawa	• • •	146
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Multi-scale analysis of solidification structures, segregation, inclusion and casting defects 2

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Slag 1

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Formation, growth, and variation of inclusion through steel production route 1

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85 Reoxidation mechanism of ultra low carbon aluminum killed steel by FeO containing slag	Y. Cho	• • •	159
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Environmental, Energy and Social Engineering

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92	Carbothermic reduction of phosphoric acid extracted from slags to produce yellow phosphorus	R. Yoshida	• • • 166
93	Behavior of pH in aqueous solution included Ca by addition of sulfuric acid solution	S. Yokoyama	• • • 167
94	(ISIJ Research Promotion Grant) Quantitative analysis of microbial adhesion to slag surface and their effects on slag	T. Takahashi	• • • 168
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95	High temperature chemical looping combustion system	K. Fujino	• • • 169
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Current technologies and issues toward achievement of low carbon and energy saving ferrous metallurgy process			
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108	Development of new iron-making process with CO ₂ cycle: production of oxalic acid from CO ₂	T. Kiyozumi	• • • 182
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