

The 189th ISIJ Meeting

Date

March 8 to 10, 2025

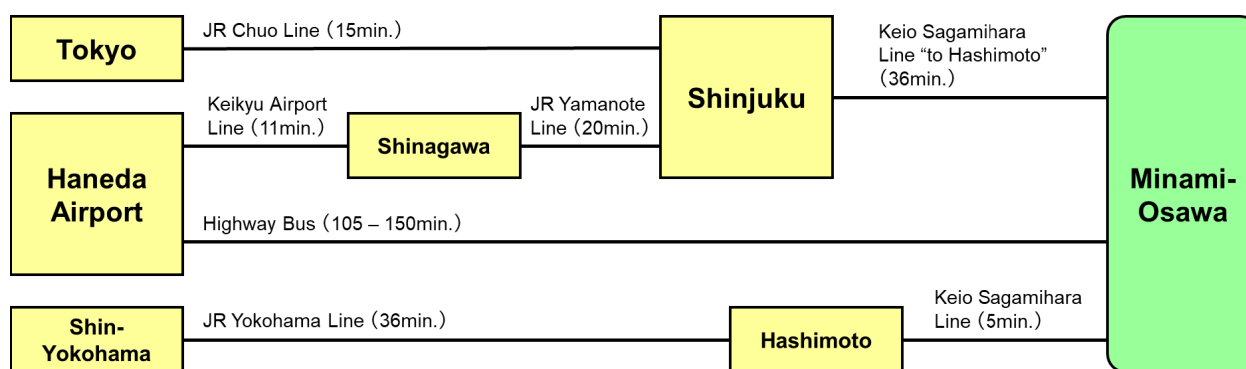
Reception: 8:15 - 12:00 (March 8), 8:15 - 16:00 (March 9), 8:15 - 14:00 (March 10)

Venue

Tokyo Metropolitan University, Minami-Osawa Campus

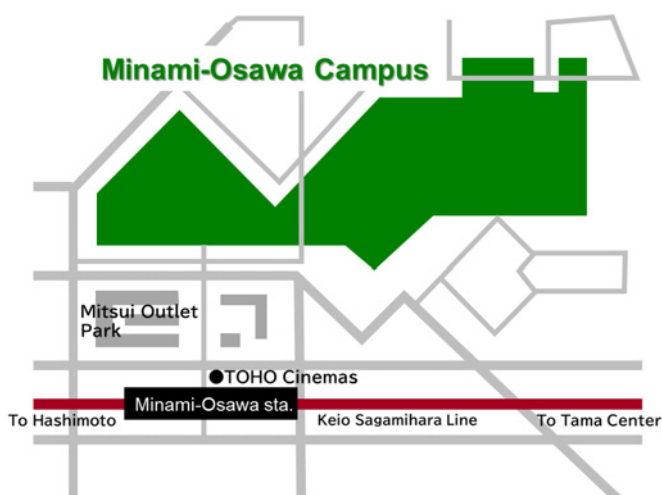
1-1 Minami-Osawa, Hachioji-shi, Tokyo 192-0397, Japan

Access to Tokyo Metropolitan University



[Keio Sagami-hara Line]

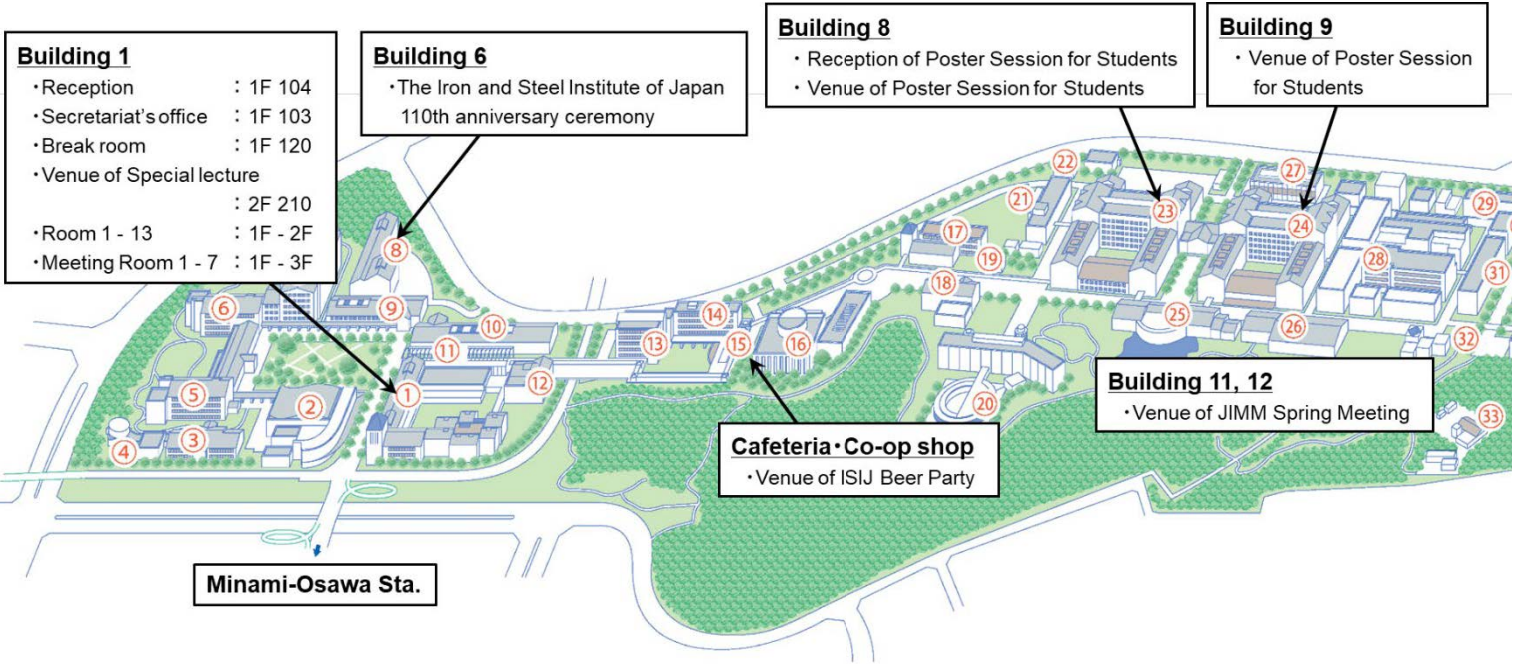
5-minute walk from the ticket gate at **Minami-Osawa Station**, Keio Sagami-hara Line. Outside the ticket gate, on the **right side** you will see the campus surrounded by greenery.



For more information, please see the following website.

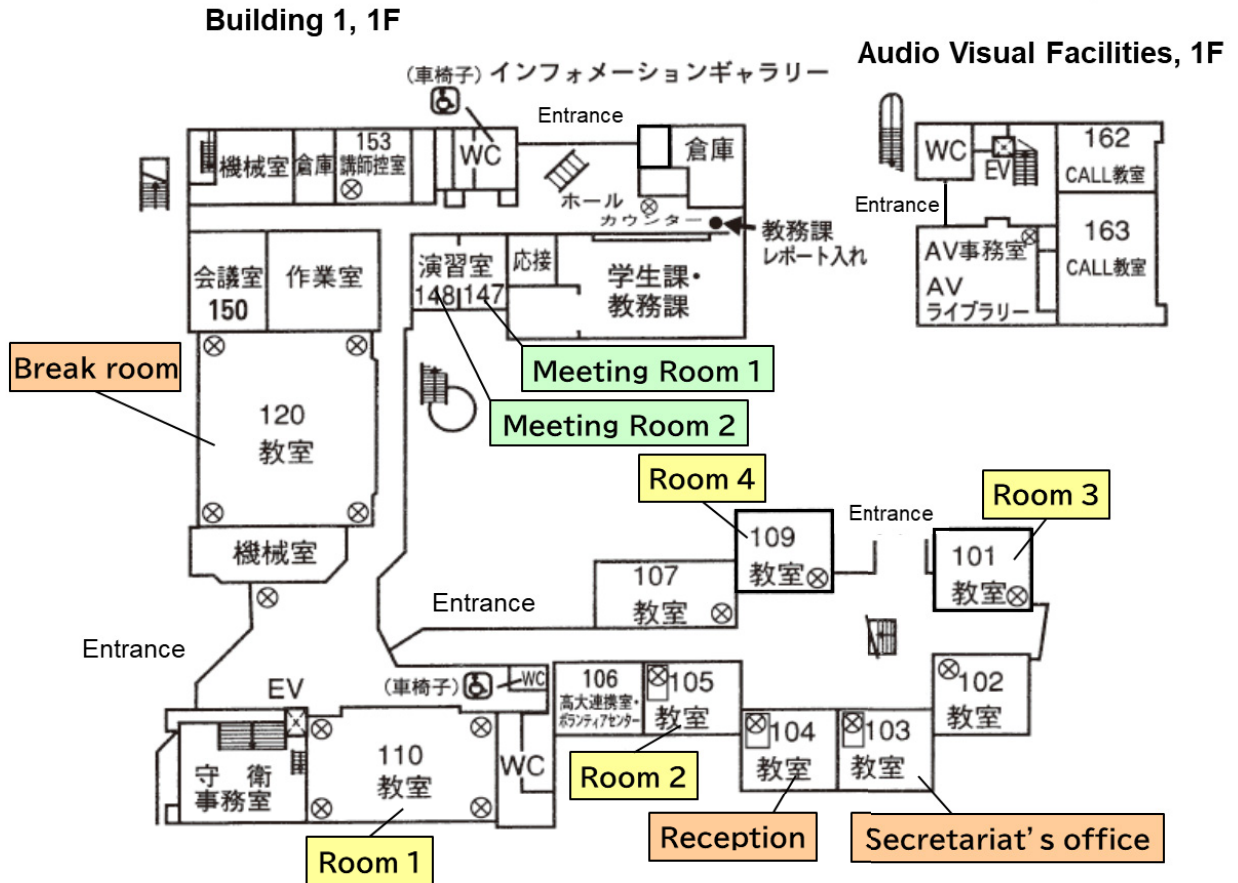
<https://www.tmu.ac.jp/english/university/access.html>

Campus map



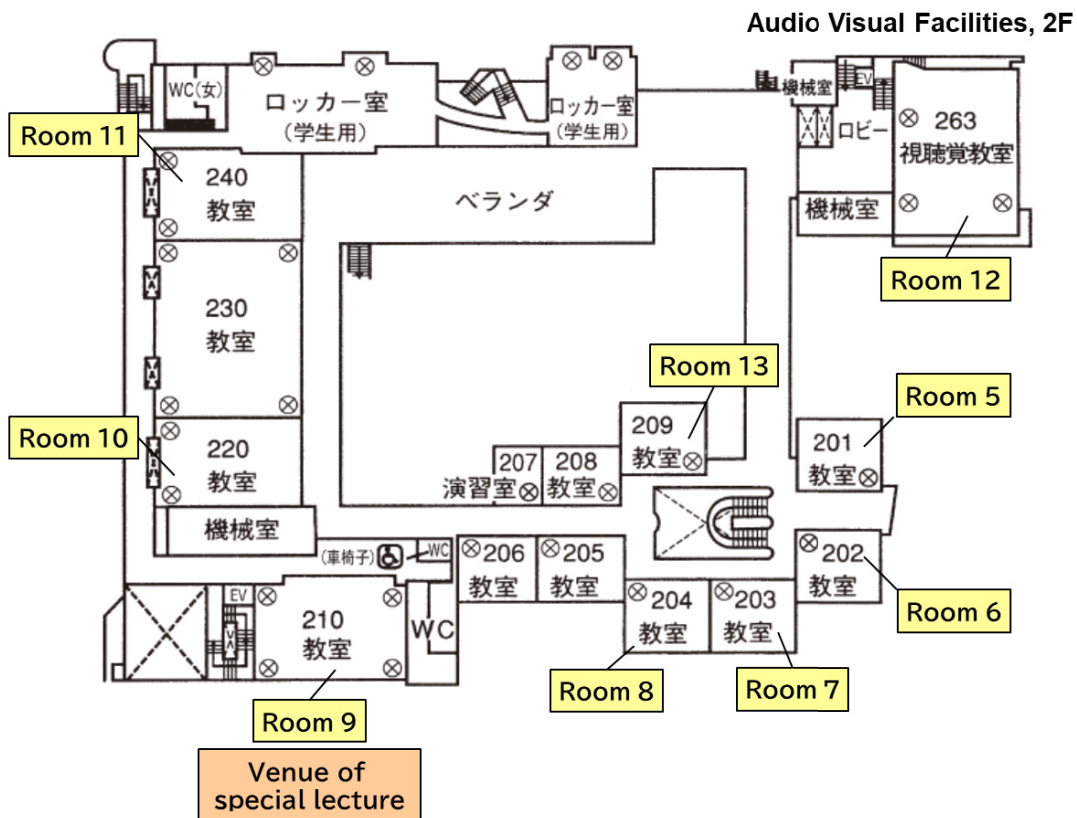
Building 1

1F



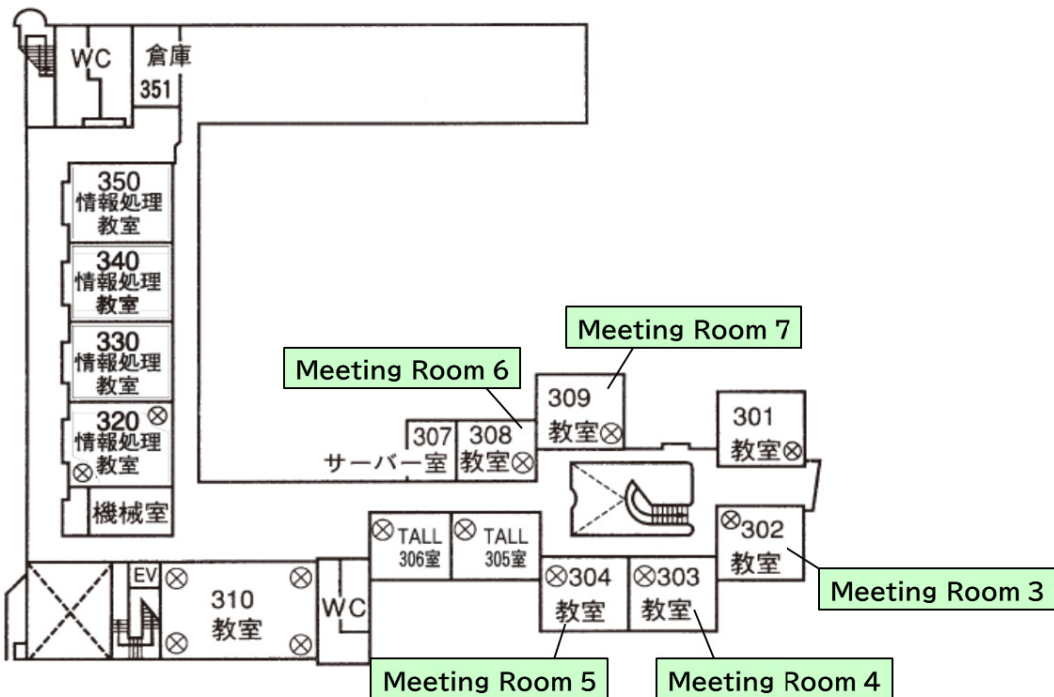
2F

Building 1, 2F



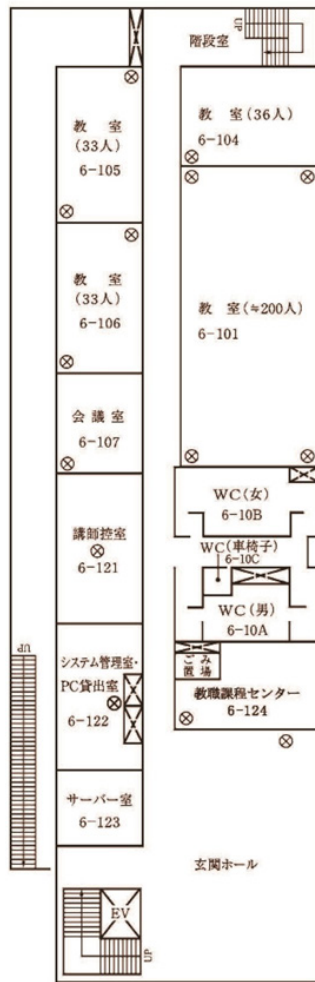
3F

Building 1, 3F

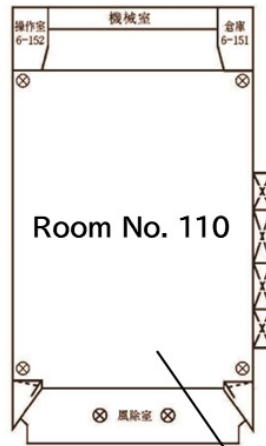


Building 6

1F



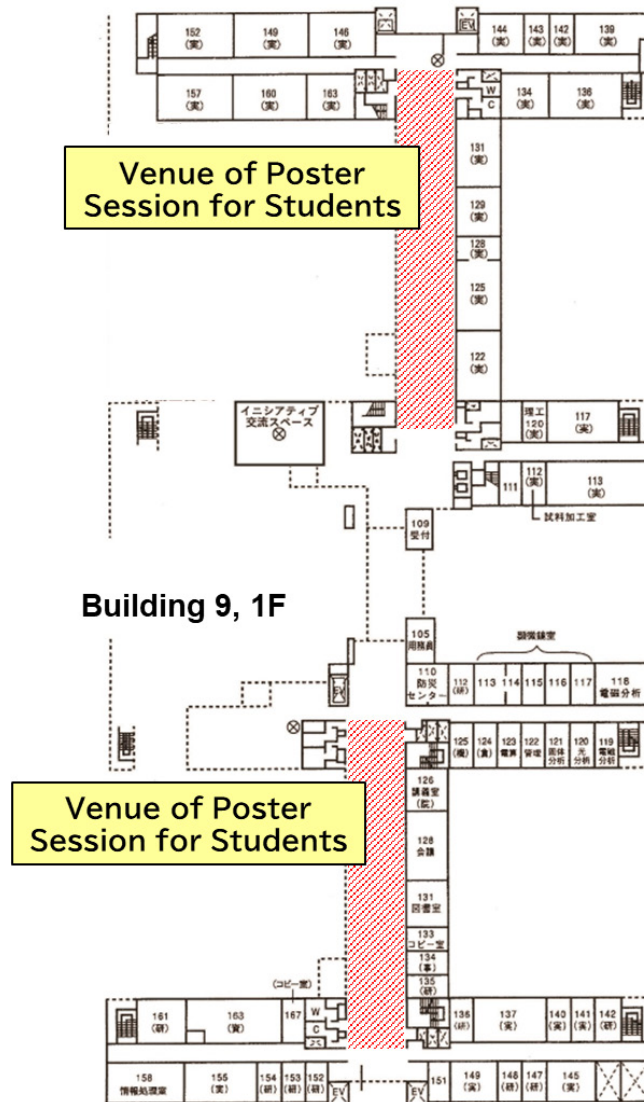
Building 6, 1F



Venue of The Iron and Steel Institute of Japan 110th anniversary ceremony

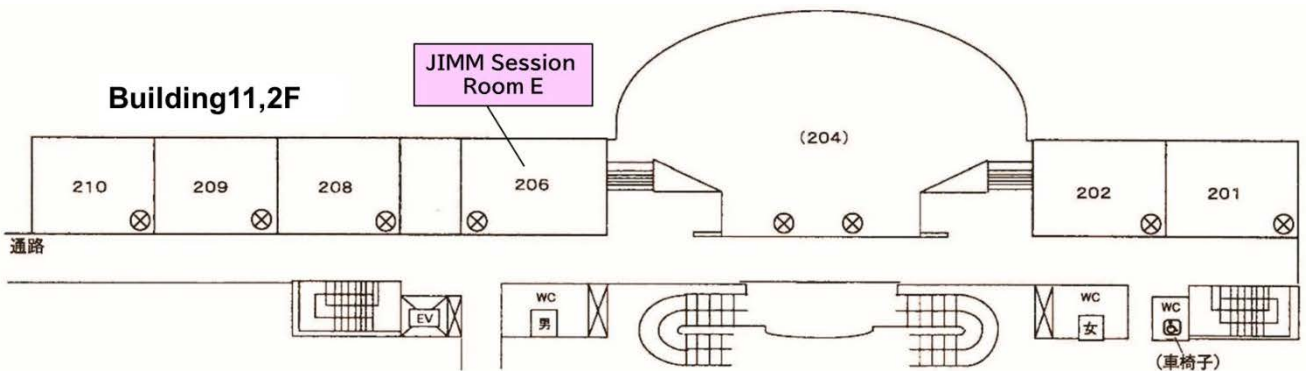
Building 8,9

1F



Building 11

2F



The timetable of the 189th ISIJ Meeting
(March 8-10, 2025 at Tokyo Metropolitan University)

Session Room	March 8 (Sat.)		March 9 (Sun.)		March 10 (Mon.)	
	AM	PM	AM	PM	AM	PM
Session Room1 Bldg. 1 1F 110	Session of young researchers leading iron- and steelmaking process [D1-D4] (9:00-12:00)	-	Smelting processes / Blast furnace [6-13] (9:00-11:55)	New smelting processes 1・2 [14-20] (14:00-16:35)	Pellet / Sintering / High-P ore utilization [36-44] (9:00-12:30)	-
Session Room2 Bldg. 1 1F 105	Young engineer session of coke-making [1-5] (9:00-10:40)	-	-	Multi-scale analysis of solidification phenomena (13:00-17:00) [Charge-Free]	Advances in evaluation of thermophysical properties for oxide melts and glasses [D12-D15] (10:00-11:40)	-
Session Room3 Bldg. 1 1F 101	Progress of the latest researches aiming at elucidating the evolution mechanism of inclusions during steel solidification process [D5-D11] (9:30-12:25)	-	Fundamentals of solidification / Property of cast metals [21-27] (9:00-11:35)	Thermodynamics / Inclusion and solidification [28-35] (14:30-17:25)	Transport phenomena and high temperature reaction fundamentals* Electromagnetic processing of materials [45-51] (9:00-11:35)	Refining process and refractories [52-56] (13:00-14:40)
Session Room4 Bldg. 1 1F 109	The cutting edge of steel scrap recycling for steel circulation (10:00-11:50) [Charge-Free]	-	Slag [57-60] (10:35-11:55)	Cutting-edge of energy technologies for GX of Iron & Steel industry I-II [61-66] (14:00-16:20)	Development of green technology in surface treatment for high performance and corrosion resistance of steels II (9:00-12:00) [Charge-Free]	Advanced measurement and analysis methods using quantum beams and their application to cultural heritage research: Current situation and future prospects in Asia [Int.-1-Int.-7] (13:00-16:20)
Session Room5 Bldg. 1 2F 201	-	-	Control / System [67-73] (9:20-12:00)	Systemic optimization of systems under uncertain environments and its methodologies [D16-D20] (14:00-17:10)	Instrumentation 1・2 [74-82] (9:00-12:00)	-
Session Room6 Bldg. 1 2F 202	Efforts of young researchers in tube forming and manufacturing [D21-D25] (9:00-12:00)	-	Current status and future prospects of DX technology in rolling processing [D26-D28] (9:05-11:10)	Rolling / Bar and wire [83-89] (14:00-16:35)	To solve problems of hot rolling rolls and visualization of roll interface phenomena [D29-D34] (9:00-11:50)	Deformation [90-93] (13:00-14:20)
Session Room7 Bldg. 1 2F 203	-	-	Heat resistant steels and alloys 1 [116-119] (10:15-11:35)	Heat resistant steels and alloys 2 [120-123] (13:30-14:50) Subjects in heat resistant metallic materials and the progress of the forum activity (15:00-17:30) [Charge-Free]	Quantification approaches of material structure factors and their applications to estimate material properties*, co-sponsored by Research Group I (Quantitative analysis of effects of structure factors on fracture strength of AM materials) and Particulate material forum (8:50-12:45) [Charge-Free]	-
Session Room8 Bldg. 1 2F 204	-	-	Surface treatment and corrosion [124-127] (10:10-11:30)	-	Phase transformation and microstructural control / Diffusion and diffusionless transformation [132-140] (9:00-12:10)	Grain boundary, Segregation [141-144] (13:30-14:50)
Session Room9 Bldg. 1 2F 210	Hydrogen embrittlement 1・2 [94-102] (9:00-12:10)	-	Special lecture meeting (9:00-10:00) [Charge-Free] Local plasticity and associated deformation/fracture resistance in martensitic steels [D35-D43] (10:15-17:05)	-	Hydrogen embrittlement 3・4 [145-152] (8:50-11:50)	Hydrogen embrittlement 5・6 [153-161] (12:50-16:00)
Session Room10 Bldg. 1 2F 220	Thermomechanical treatment / Aging and precipitation [103-110] (9:00-12:00)	-	ISIJ and JIMM Joint Sessions Titanium and its alloys 1 [J1-J4] (10:30-11:50)	ISIJ and JIMM Joint Sessions Titanium and its alloys 2・3 [J5-J12] (14:00-16:50)	Fatigue [162-166] (10:00-11:40)	Toughness [167-170] (13:00-14:20)
Session Room11 Bldg. 1 2F 240	Modeling and simulation of phenomena [111-115] (9:00-10:40)	-	Innovative evaluation techniques for hydrogen entry and hydrogen trapping - V (8:50-12:20) [Charge-Free]	Advances in friction welding technology and proposal of steel design guidelines ~Innovative solid-state joining technologies, including friction welding~ (14:00-16:45) [Charge-Free]	Strength and deformation behavior 1・2 [171-178] (9:00-12:00)	Strength and deformation behavior 3 [179-182] (13:00-14:20)
Session Room12 AV Bldg. 2F 263	-	-	Stainless steels [128-131] (10:20-11:40)	High functionality of stainless steel leading to a sustainable society (14:00-17:10) [Charge-Free]	Electrical steel / Recrystallization and texture [183-189] (9:00-11:40)	-
Session Room13 Bldg. 1 2F 209	-	-	Elemental analysis / Precipitate and inclusion analysis / Crystal structure analysis [190-196] (9:00-11:35)	Fusion of state-of-the-art technologies and solution chemistry to develop novel steel analyses [D44-D49] (14:00-16:15)	Structure Analysis for Iron and Steels -Combined Use of Real and Reciprocal Space (9:00-16:00) [Charge-Free]	
JIMM Room E Bldg. 11 2F 206	-	-	ISIJ and JIMM Joint Sessions Physico-chemical properties of high temperature melts 1 [J13-J15] (10:30-11:40)	ISIJ and JIMM Joint Sessions Physico-chemical properties of high temperature melts 2・3 [J16-J21] (14:00-16:15)	-	-
The Iron and Steel Institute of Japan 110th anniversary ceremony (Ceremony conferment of the honorary membership and prize awarding, memorial lecture) (13:00-17:00 at Bldg.6 110) Banquet (18:30-20:30 at LINK FOREST(3-5-3 Tsurumaki, Tama-shi, Tokyo 206-0034 Japan)) [10,000yen]		Poster Session for Students (11:30-14:30 at Hallway, Bldg.8.9 1st Fl.) [Charge-Free] ISIJ Beer Party (17:30-19:00 at Cafeteria) [1,000yen]				

[] : Lecture Number
() : Lecture Time
■ : Event to be held during the 189th ISIJ Meeting (Symposium, Poster Session for students)

Program of the 189th ISIJ Meeting (March 8-10, 2025)

Discussion Sessions

High Temperature Processes

Lecture No.				
Discussion Session	Title	Speaker		Page
Session of young researchers leading iron- and steelmaking process				
D1	Uncertainty evaluation in quantitative analysis – in the case of boron	T. Sumita	• • •	1
D2	Evaluation of modification of alumina inclusions in molten steel by calcium treatment	Y. Liu	• • •	3
D3	Low temperature reduction disintegration mechanism of basic pellet under hydrogen shaft furnace	K. Momma	• • •	5
D4	Reaction heat management technology in PSA process using oxygen storage materials	K. Tanahashi	• • •	7
Progress of the latest researches aiming at elucidating the evolution mechanism of inclusions during steel solidification process				
D5	Evaluation of activity coefficients of oxygen and nitrogen in molten Fe-based alloy using solvation shell model	M. Suzuki	• • •	10
D6	Demonstrating solidification path and metastable ferrite nucleation induced by non-metallic inclusions in Fe-22Mn-0.7C alloys using time-resolved X-ray imaging techniques	T. Narumi	• • •	11
D7	(ISIJ Research Promotion Grant) Quantitative understanding of microsegregation and inclusion formation behaviors during solidification using model solution	S. Kawanishi	• • •	15
D8	Precipitation behavior of MnS from molten iron to Al ₂ O ₃ during solidification	K. Kato	• • •	17
D9	Research on the evolution and growth behavior of non-metallic inclusions during solidification through unidirectional solidification experiments	H. Matsuura	• • •	20
D10	Proposal on evaluation method for distribution of inclusions in micro segregation/structure of unidirectional solidified steel	A. Takahashi	• • •	22
D11	Proposal for estimation of fraction solid in the horizontal cross section of unidirectionally solidified specimen	H. Esaka	• • •	25
Advances in evaluation of thermophysical properties for oxide melts and glasses				
D12	Compositional dependence of phonon mean free path in silicate glasses and melts	S. Sukenaga	• • •	27
D13	Dominant factor for thermal conductivity of silicate melts: a molecular dynamics study with and without quantum correction	M. Shimizu	• • •	29
D14	Investigation on improvement of measurement accuracy for the thermal conductivity of slag using transient hot wire method	R. Endo	• • •	31
D15	Status of thermal conductivity evaluation of alkali aluminosilicate melts	T. Nishi	• • •	34
Instrumentation, Control and System Engineering				
Systemic optimization of systems under uncertain environments and its methodologies				
D16	Systemic optimization technology for production management in integrated steel works	T. Iwatani	• • •	36
D17	An agent-based logistics simulator in an iron and steel-making plant for systemic optimization	I. Ono	• • •	38
D18	Possibility of visualization of the lower steelmaking processes by time automaton modeling	K. Sakakibara	• • •	42
D19	Parameter estimation for a simulator by real-coded GA	S. Kurahashi	• • •	44
D20	Development of dynamic exergy flow network for systemic optimization (Macro visualization of exergy flow in BF-BOF route)	H. Suwa	• • •	46
Processing for Quality Products				
Efforts of young researchers in tube forming and manufacturing				
D21	(Invited Lecture) Deformation behavior in combined drawing–twisting process of aluminum heat-transfer tubes	H. Fukumasu	• • •	48
D22	Work hardening of thin-walled tube subjected to tension–internal pressure–torsion	K. Yoshida	• • •	52
D23	(ISIJ Young Researcher Award) Development of tube bulge forming apparatus with digital image correlation system and biaxial bulge test for a 590 MPa high strength steel sheet	T. Hakoyama	• • •	55
D24	Effects of scale composition and thickness with Cr content on wear resistance	J. Akaike	• • •	59
D25	Expansion drawing for producing tubes with various cross-sectional shapes	S. Kajikawa	• • •	63
Current status and future prospects of DX technology in rolling processing				
D26	Technologies and applications for smart manufacturing in rolling lines	N. Kubo	• • •	67
D27	Anomaly detection system for hot rolling process based on data science	M. Matsushita	• • •	71
D28	Intelligent automatic flatness control of cluster mills	T. Osaka	• • •	75

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To solve problems of hot rolling rolls and visualization of roll interface phenomena

D29	Formation of oxide scale and estimation of interface temperature using twin-disc-type high temperature wear testing machine	A. Yanagida	• • •	78
D30	Finite element analysis on wear behavior of hot roll material by hot rolling wear simulator	K. Hayakawa	• • •	80
D31	Influence of microstructures on high temperature wear characteristics of multi-component white cast iron	K. Yamamoto	• • •	82
D32	Behavior of steel surface with blistered scale during hot rolling	K. Fujii	• • •	84
D33	Dependency of void closure behavior on location and stress state in hot rolling process	N. Ueshima	• • •	88
D34	Effect of carbides on the formation of oxide scale on the surface of hot rolled rolls	N. Yukawa	• • •	92

Microstructure and Properties of Materials

Local plasticity and associated deformation/fracture resistance in martensitic steels

D35	Relationship between heterogeneity of deformation behavior and local hardness in martensitic steels	S. Nambu	• • •	94
D36	Effect of Cu on ductility in tempered martensitic steel sheet -part 1-	J. Tobata	• • •	95
D37	Effect of Cu on ductility in tempered martensitic steel sheet -Part 2-	Y. Kawasaki	• • •	98
D38	Effect of Cu addition on fatigue properties of tempered martensitic steel	N. Yamaguchi	• • •	102
D39	Dependence of habit plane orientation on fatigue strength in low carbon martensitic steel	T. Chiba	• • •	106
D40	Hydrogen embrittlement susceptibility of martensitic steel corresponding to local plastic relaxation ability at prior austenite grain boundaries	K. Okada	• • •	107
D41	Controlling lattice defects and substructures for reduction in hydrogen embrittlement susceptibility in high-strength steel	K. Saito	• • •	111
D42	Analysis of hydrogen embrittlement mechanism of tempered martensitic steel by atmospheric corrosion	M. Kawamori	• • •	115
D43	Effect of shape factors on hydrogen embrittlement evaluation using a notched plate tensile test	T. Omura	• • •	119

Process Evaluation and Material Characterization

Fusion of state-of-the-art technologies and solution chemistry to develop novel steel analyses

D44	Chemical verification of a spectrophotometric method for determination of tungsten in steel samples	H. Mizuguchi	• • •	123
D45	Development of a simple colorimeter using a white-color LED and a color sensor and its application to steel analysis by titration	Y. Suzuki	• • •	124
D46	(ISIJ Research Promotion Grant) Application of image processing to evaluation of steel materials	A. Inagawa	• • •	125
D47	Factors affecting precipitation formation and rinsing process in the gravimetric method after separation of iron	M. Soma	• • •	126
D48	Factors affecting precipitation reactions providing bases of gravimetry for wet-analysis of steel	N. Uehara	• • •	128
D49	How we explain sophisticated skills acquired by trained analytical engineers of iron and steels through chemistry	N. Uehara	• • •	129

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International Organized Sessions

2025/3/10 Room 4

Lecture No.	Title	Speaker	Page
Advanced measurement and analysis methods using quantum beams and their application to cultural heritage research: Current situation and future prospects in Asia			
13:00-13:05 Opening Address: M. Tanaka [Tokyo Univ. of the Arts]			
Chair: M. Sakurai [Otani Seiun]			
13:05-13:25			
Int.-1	High-energy X-ray multi-scale imaging at SPring-8	JASRI ○M. Hoshino · K. Uesugi	130
13:25-13:45			
Int.-2	Nondestructive analysis of articulated iron objects using synchrotron radiation, neutron, and muon	Tokyo Univ. of the Arts ○M. Tanaka	133
13:45-14:15			
Int.-3	(Invited Lecture) Pulsed neutron imaging study of Japanese swords at J-PARC	JAEA ○K. Oikawa	134
Chair: K. Ninomiya [Hiroshima Univ.]			
14:30-15:00			
Int.-4	(Invited Lecture) Research advances in the energy-resolved imaging instrument of CSNS and its potential applications in cultural heritage research	Institute of High Energy Research, Chinese Academy of Sciences ○S. Wang	135
15:00-15:30			
Int.-5	(Invited Lecture) Nondestructive imaging analysis of an ancient iron knife using integrated X-ray CT, neutron tomography, and computed laminography	Palace Museum ○Y. Lei	137
15:30-15:50			
Int.-6	Muon Induced X-ray Emission (MIXE) analysis and its imaging technology	Osaka Univ. ○A. Sato	138
15:50-16:10			
Int.-7	Non-destructive 3D elemental imaging method using muon and neutron beams with CdTe-DSD	JAEA ○I. Chiu	140
16:10-16:15 Concluding Remarks: Y. Lei [Palace Museum]			
16:15-16:20 Closing Address: T. Nakanishi [Kyushu Univ.]			

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High Temperature Processes

Lecture No.	Title	Speaker	Page
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Young engineer session of coke-making			
1	Effect of particle size on crack formation at high contraction vitrinite in coke	S. Konno	• • • 144
2	Applying powder compression equation for coal compacting phenomena	M. Nagayama	• • • 145
3	Stabilization of coke quality by the improved loading history management of the coal yard	N. Suzuki	• • • 146
4	Measures to reduce coke moisture by uniform loading shape in wet quenching of coke	K. Nishino	• • • 147
5	Downsizing of sulfuric acid plants by oxygen-enriched combustion	S. Taya	• • • 148
Smelting processes			
6	(110th Anniversary Lecture (Invited)) Importance of gas analysis on the reaction mechanism in blast furnace and the forefront of phosphorus production	Y. Kashiwaya	
7	(Tawara Award • 110th Anniversary Lecture (Invited)) Influence of TiO ₂ % in iron sand on cast iron production by Tatara iron making	Y. Kubo	• • • 149
8	(Nishiyama Commemorative Prize • 110th Anniversary Lecture (Invited)) Development of technology for behavior evaluation and stable operation of blast furnace	T. Nishimura	• • • 150
9	Evaluation degradation behavior of iron ore sinter reduced with H ₂ -CO gas through labo-scale rotating drum tests	H. Tsuchiya	• • • 151
Blast furnace			
10	(Nishiyama Commemorative Prize • 110th Anniversary Lecture (Invited)) Development of permeability improvement technology for low-carbon blast furnace operation	A. Murao	• • • 152
11	(ISIJ Young Researcher Award • 110th Anniversary Lecture (Invited)) Numerical simulation for liquid holdup in a blast furnace	T. Kon	
12	Development of slag level estimation model considering the porosity of lower part	Y. Kawashiri	• • • 153
13	Development of heat transfer-stress model for startup of long-term shutdown blast furnace	R. Matsunaga	• • • 154
New smelting processes 1			
14	(110th Anniversary Lecture (Invited)) Merge and reincarnation of ironmaking and steelmaking by next-generation players of high-temperature process JAPAN	K. Morita	
15	Pellet clustering phenomena in H ₂ reduction step with no loading conditions	T. Kon	• • • 155
16	Temperature and ore type dependence on hydrogen reduction behavior of iron ore fine	K. Fujino	• • • 156
17	Hydrogen-based iron-making system simulation: A pathway to a low-emission iron industry	C. Tamzysi	• • • 157
New smelting processes 2			
18	Carbon deposition behavior catalyzed by porous iron whisker using CO-CO ₂ -H ₂ O gas mixture	R. Higashi	• • • 158
19	(ISIJ Research Promotion Grant) Reduction of hematite powder by pulsed-discharged spouted bed	P. Khlaisongkham	• • • 159
20	Nickel smelting using plasma jet melting	M. Uchikoshi	• • • 160
Fundamentals of solidification			
21	Effect of solidification morphological change on material properties prediction in data assimilation	A. Yamamura	• • • 161
22	Simulations of 2D simple shear semi-solid deformation using multi-phase-field lattice Boltzmann model: Evaluations for the effects of deformation rate	N. Yamanaka	• • • 162
23	Influence of Hf addition on austenite grain coarsening after a massive-like Ferrite-to-Austenite transformation in Fe-0.45C steel	Y. Wang	• • • 163
24	Crystallographic characterization of a massive-like transformation in carbon steel analyzed based on 4D-CT+XRD measurements	H. Yasuda	• • • 164
Property of cast metals			
25	(Mishima Medal • 110th Anniversary Lecture (Invited)) Research and development of numerical analysis technology for continuous casting and its practical application	N. Yamasaki	
26	(Nishiyama Commemorative Prize • 110th Anniversary Lecture (Invited)) Development of casting process for special steels	Y. Sumi	• • • 165
27	(Paper Award for Young Researchers • 110th Anniversary Lecture (Invited)) Surrogate-based shape optimization of immersion nozzle in continuous casting	T. Namba	• • • 166

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Thermodynamics

28 (Sawamura Award • 110th Anniversary Lecture (Invited)) Effect of alumina on the phase equilibria of the iron-rich corner of the CaO-SiO ₂ -Fe ₂ O ₃ system at 1240°C in air	M. Hayashi	• • •	167
29 Interaction parameter between La and Cr in molten iron at 1873K	S. Oba	• • •	168
30 Anion substitution in mayenite Ca ₁₂ Al ₁₄ O ₃₃	M. Hasegawa	• • •	169
31 Thermodynamic treatment of transition metal oxides in molten slags	K. Saito	• • •	170

Inclusion and solidification

32 (Sawamura Award • 110th Anniversary Lecture (Invited)) Formation mechanism of secondary inclusions in Fe-36mass%Ni alloy using a novel combination analysis technique	H. Fukaya	• • •	171
33 Equilibrium between molten Fe-Ni alloy and Al ₂ O ₃ -SiO ₂ -MnO-MgO slag	R. Habu	• • •	172
34 Effect of solidification conditions on sulfide formation behavior in free-machining ferritic stainless steel	K. Chiba	• • •	173
35 Spherical particle behavior moving between simulated dendrites	Y. Miura	• • •	174

Pellet

36 Strength factor analysis of low-grade iron ore pellets	G. Sato	• • •	175
37 Development of pellet particle size measurement equipment (Improvement of pelletizing plant operation by pellet diameter sensor -1)	K. Kuwana	• • •	176
38 Analysis of balling yield and improvement of fuel intensity using by pellet diameter Sensor (Improvement of pelletizing plant operation by pellet diameter sensor -2)	T. Kato	• • •	177

Sintering

39 (Sawamura Award • 110th Anniversary Lecture (Invited)) Effect of REMO-tec (re-ignition sintering) process on saving energy development of REMO-tec (RE-ignition method for optimization of total energy consumption) - 10	M. Matsumura	• • •	178
40 Improvement of productivity by combining REMO-tec and oxygen enrichment	S. Nakamura	• • •	179
41 Effect of coke coating of iron ore granules on sintering phenomena using ultra-fine	K. Takehara	• • •	180

High-P ore utilization

42 Relationship between goethite texture and P concentration in Australian iron ores	T. Takayama	• • •	181
43 Characterization of phosphate ion adsorption on iron oxyhydroxide surface	K. Shinoda	• • •	182
44 Effective de-phosphorus treatment by roasting by addition of limestone with high basicity	T. Murakami	• • •	183

Transport phenomena and high temperature reaction fundamentals

45 (Tawara Award • 110th Anniversary Lecture (Invited)) In-situ observation of sintering interface between Al ₂ O ₃ particle / single crystalline Al ₂ O ₃ plate through single crystalline Al ₂ O ₃ plate	M. Nakamoto	• • •	184
46 Desulfurization kinetics study of gas-slag-metal interface: Density functional theory and Molecular dynamics	L. Wang	• • •	185
47 Slag foaming generated by CO bubbles in laboratory experiments	Y. Uchida	• • •	186
48 Fluid discharge behavior of mechanical slag dragger at cold model experiment	Y. Higuchi	• • •	187

Electromagnetic processing of materials

49 Design of a 30kW microwave furnace for sintering fly ash	K. Kashimura	• • •	188
50 (ISIJ Research Promotion Grant) Reaction of steel/Ga diffusion couples under high magnetic fields	Y. Mitsui	• • •	189
51 Segregation of Sn-Pb alloy solidified under superimposition of static magnetic field and AC current	T. Fujimura	• • •	190

Refining process and refractories

52 Simulation result of EMS and Gas stirring effect for large electric arc furnace	H. Yoda	• • •	191
53 Estimation of chemical composition of molten slag by impedance measurement	Y. Harada	• • •	192
54 Supersonic jet characteristics and combustion behavior of RH multifunctional oxygen lance at low ambient pressure	H. Zhang	• • •	193
55 Development of internal defect detection technology of refractory lining	K. Yoshida	• • •	194
56 Durability improvement of MgO-C bricks in ladle slag line by selection of antioxidants considering temperature history	R. Shimizu	• • •	195

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Slag

57	(ISIJ Research Promotion Grant) Distribution and concentration behavior of samarium in steelmaking slag	T. Iwama	• • •	196
58	Synthesis of LiFePO ₄ using Fe-P alloys reduced from steelmaking slag	J. Deng	• • •	197
59	Extraction of phosphorus from steelmaking slag in a molten salt bath	X. Yang	• • •	198
60	Fluorine contamination behavior and its measure in EF reducing slag	A. Uehara	• • •	199

Sustainable Systems

Lecture No.	Title	Speaker	Page
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Cutting-edge of energy technologies for GX of Iron & Steel industry I			
61	New chemical recycling of waste plastic in the smelting process of ferronickel	Y. Kashiwaya	• • • 200
62	Application of polymer materials for lightweight and heat transfer control of gas-solid chemical thermal storage system	S. Kojima	• • • 201
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