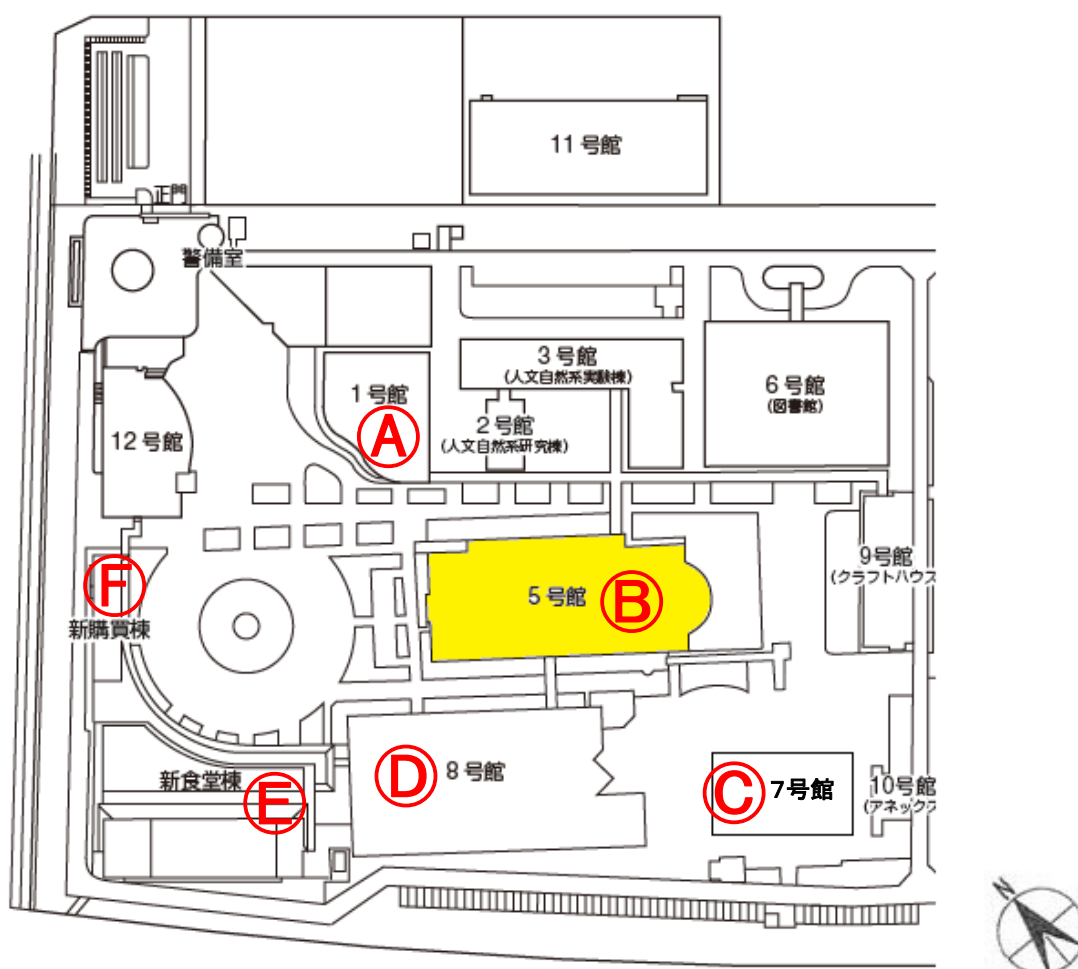


# Program of the 175th ISIJ Meeting

## Campus map

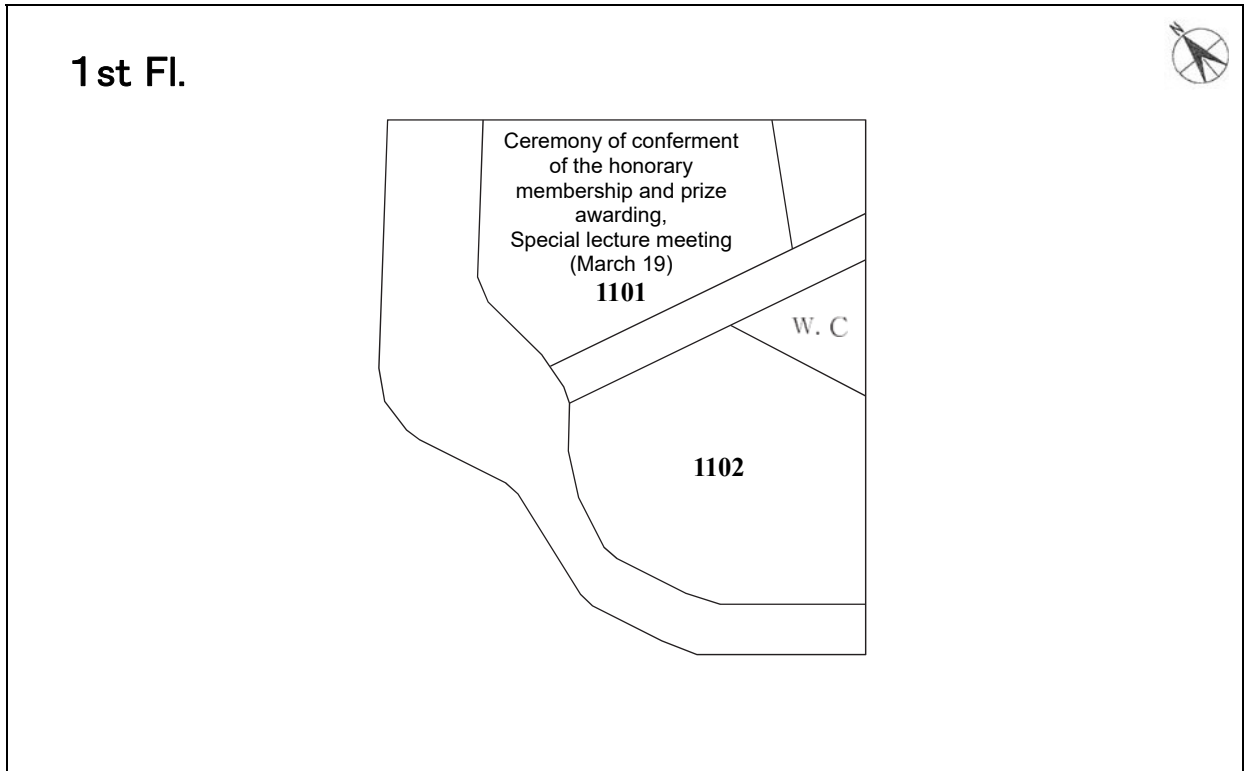


- (A) Building No.1: Ceremony of conferment of the honorary membership and prize awarding, Special lecture meeting(1st Fl.)
- (B) Building No.5: ISIJ Reception Desk & Secretariat, Session Room 1 (1st Fl.), Session Room 2–3 (2nd Fl.), Session Room 4 (3rd Fl.)
- (C) Building No.7: Session Room 7, 13–17 (2nd Fl.)
- (D) Building No.8: Session Room 5, 6 (1st Fl.) , Session Room 8–12(2nd Fl.)
- (E) Canteen Building: Cafeteria(1st Fl.), Banquet, ISIJ Beer Party(2nd Fl.), Poster Session for Students(3rd Fl.)
- (F) Shop

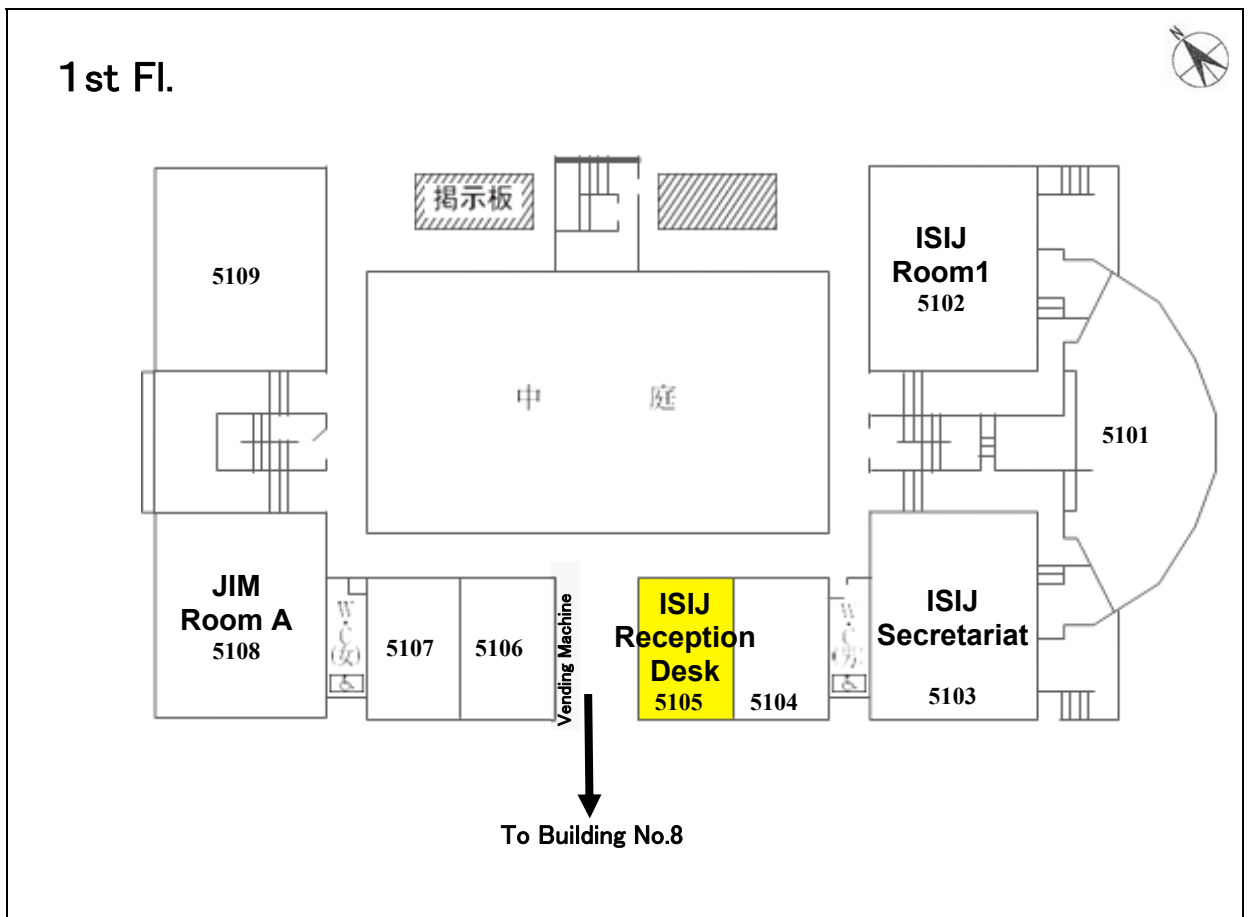
## Banquet

1. Date: March 19, 2018 18:00~20:00
2. Venue: Canteen Building, Shin-Narashino Campus (2nd Fl.)
3. Fee: 7,000yen

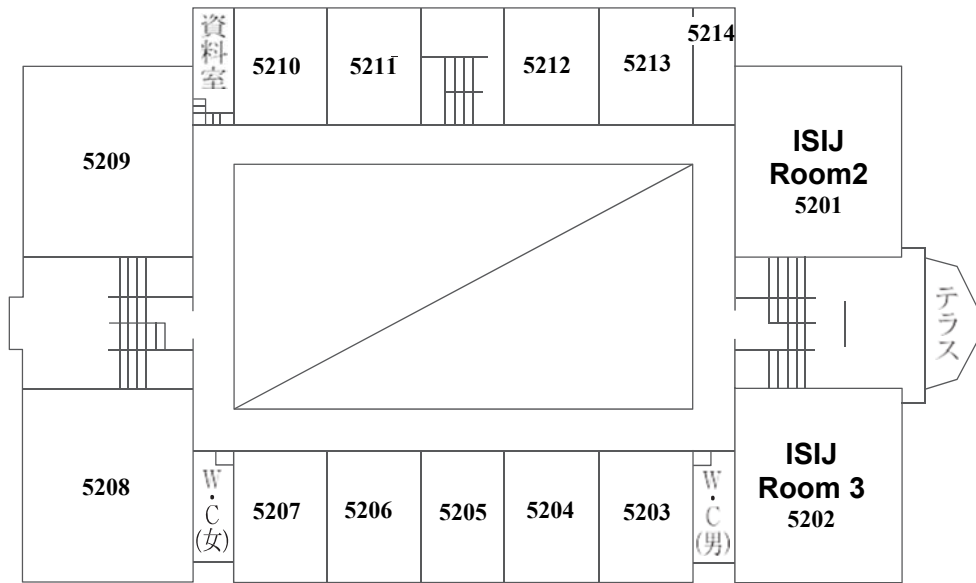
# Building No.1



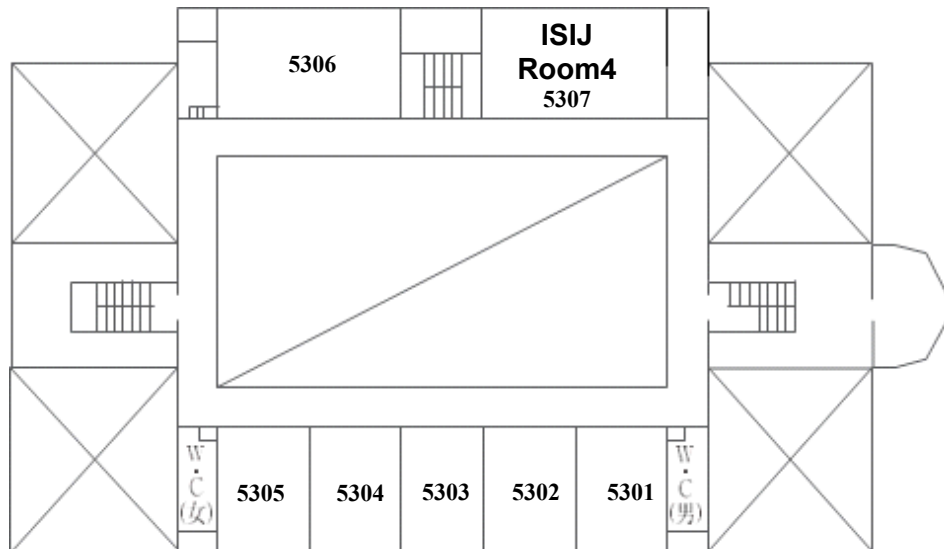
# Building No.5



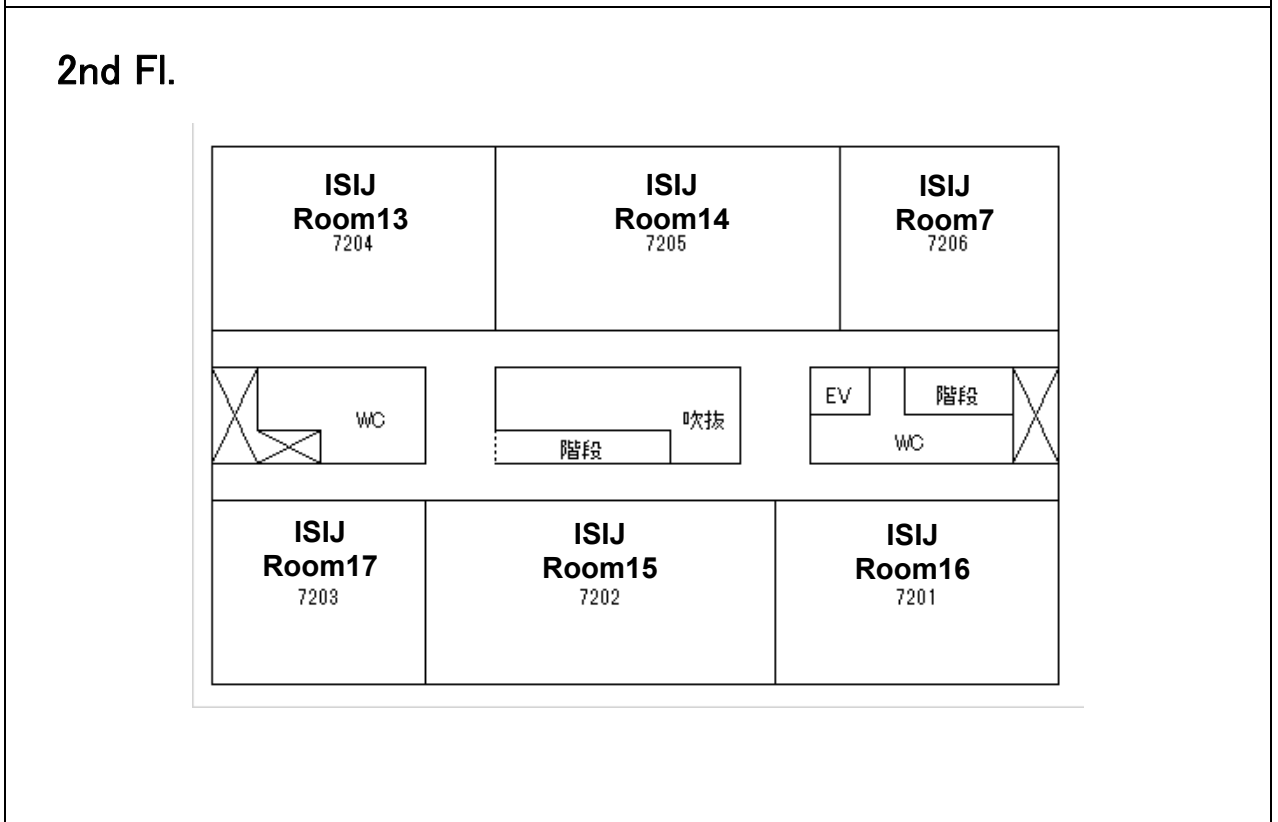
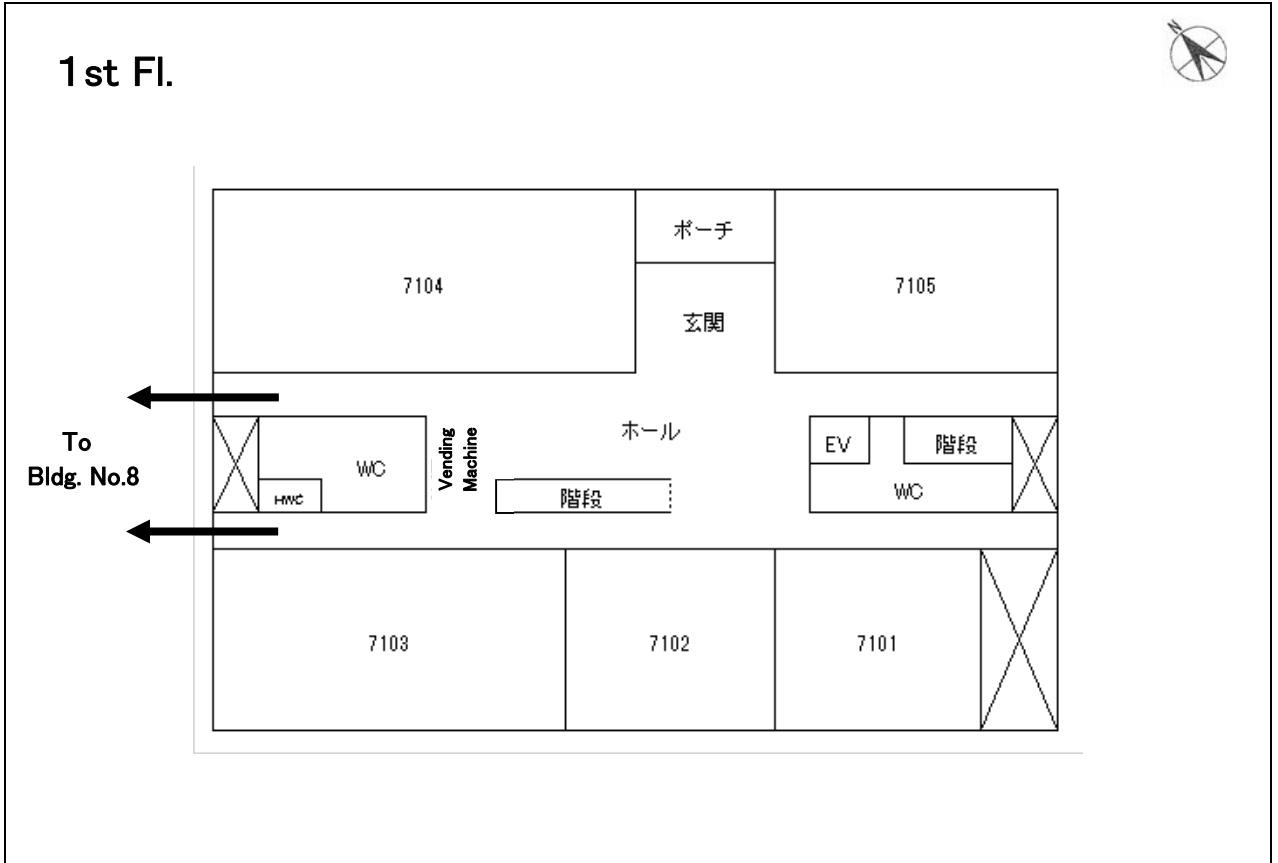
## 2nd Fl.



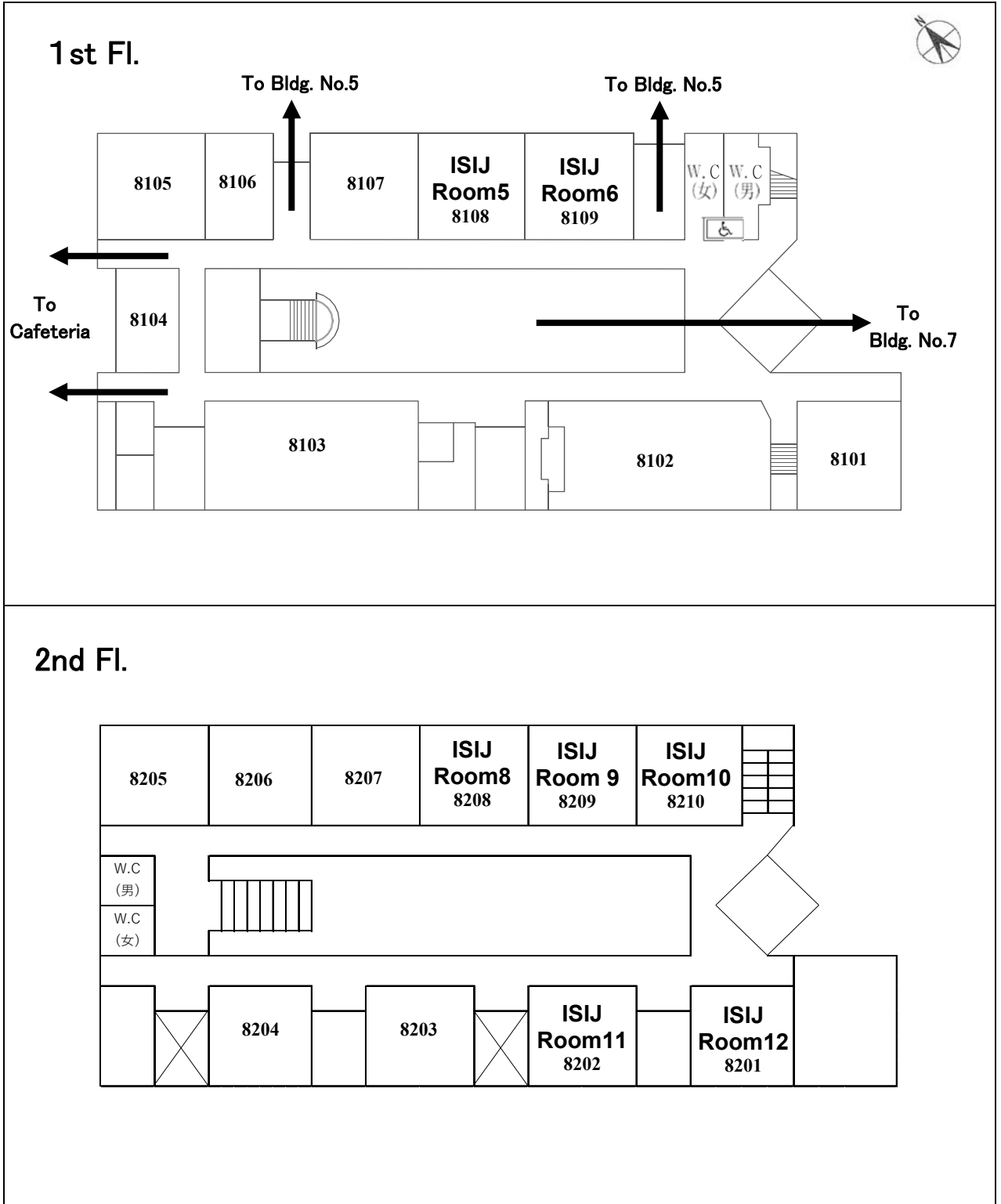
## 3rd Fl.



# Building No.7



# Building No.8



The timetable the 175th ISIJ Meeting  
(March 19–21, 2018 at Chiba Institute of Technology, Shin–Narashino Campus)

Session Room	Mar. 19 (Mon.)		Mar. 20 (Tue.)		Mar. 21 (Wed.)	
	AM	PM	AM	PM	AM	PM
Session Room 1 No.5 Bldg. Room 5102	Refractories [1–5] (10:00–11:40)	---	Transport phenomena 1•2 [23–29] (9:00–11:30)	Cutting-edge approaches by multidiscipline fields for comprehension of high temperature phenomena and materials design Vol.2 1•2•3 [30–41] (13:00–17:20)	Continuous casting and solidification [73–77] (9:30–11:10)	---
Session Room 2 No.5 Bldg. Room 5201	Thermodynamics 1•2 [6–14] (9:00–12:10)	---	Agglomeration processes/Young engineer session of iron making [42–49] (9:10–12:00)	Softening and melting behavior/ Fluid flow in lower zone/ Reduction of iron oxide [50–58] (13:30–16:50)	Operational improvement and theoretical consideration in refining process 1•2 [78–85] (9:00–11:50)	Operational improvement and theoretical consideration in refining process 3 [86–88] (13:00–14:00)
Session Room 3 No.5 Bldg. Room 5202	Young engineer session of coke-making 1•2 [15–22] (9:00–11:50)	---	Research and development of technique elements aiming for new-cokemaking process [D1–D9] (9:30–16:45)	---	Electromagnetic processing of materials/Novel processing [89–96] (9:00–11:50)	Coke making [97–101] (13:00–14:40)
Session Room 4 No.5 Bldg. Room 5307	---	---	Approach of steelmaking to mitigating climate change [Int.1–9] (9:30–15:45)	---	---	---
Session Room 5 No.8 Bldg. Room 8108	Eco-technology for iron and steelmaking system with energy and material recycling II 1•2 [102–109] (9:00–11:50)	---	Solidification and structure control 1•2 [59–64] (9:30–11:40)	Elucidation of dynamics in solid-liquid coexisting zone and formation mechanism of cast defects (13:00–16:25)[Charge-free]	Production and utilization of clean raw materials and fuels and/or clean energy [125–127] (10:30–11:30)	---
Session Room 6 No.8 Bldg. Room 8109	Analysis and assessment on social value of steel 1•2 [110–115] (10:00–12:10)	---	Slag and dust treatment 1•2 [65–72] (9:00–11:50)	Energy and environment 1•2/ Cultural heritage [116–124] (13:00–16:20)	SMART research group final report: Development of innovative ironmaking system with carbon and materials recycling [D10–D20] (8:50–16:30)	
Session Room 7 No.7 Bldg. Room 7206	---	---	Instrumentation 1 [128–131] (10:00–11:20)	Instrumentation 2/ Control and system [132–139] (13:10–16:00)	---	---
Session Room 8 No.8 Bldg. Room 8208	---	---	Manufacturing technology of high quality and high functional bar and wire/Tribology [140–147] (9:00–11:50)	Advances in material modeling for the forming simulations of steel sheets [D21–D29] (13:00–17:00)	Cooling/Rolling [148–154] (9:20–11:50)	Current research and development in cold rolling [D30–D35] (13:00–16:15)
Session Room 9 No.8 Bldg. Room 8209	Structure analysis of martensite [155–159] (10:20–12:00)	---	Modeling and simulation/ Aging and precipitation [169–176] (9:00–11:50)	Microstructure formation 1•2 [177–184] (13:40–16:30)	Microstructure formation 3 [251–255] (9:30–11:10)	---
Session Room 10 No.8 Bldg. Room 8210	Fabricability [160–163] (9:00–10:20)	---	Strength and deformation behavior 1•2 [185–191] (9:20–11:50)	Strength and deformation behavior 3•4 [192–198] (13:00–15:30)	Machine structural steel 1•2 [256–262] (9:00–11:30)	Machine structural steel 3/ Machinability [263–266] (13:00–14:20)
Session Room 11 No.8 Bldg. Room 8202	Fatigue property [164–168] (10:00–11:40)	---	Stainless steels 1•2 [199–205] (9:30–12:00)	Heat resistant steels/ Heat resistant alloys [206–212] (14:00–16:30)	Electrical steels and magnetic materials 1•2 [267–274] (9:10–12:00)	---
Session Room 12 No.8 Bldg. Room 8201	---	---	Hydrogen embrittlement 1•2 [213–219] (9:20–11:50)	Hydrogen embrittlement 3•4•5 [220–230] (13:00–17:00)	Hydrogen embrittlement 6•7 [275–280] (9:30–11:40)	---
Session Room 13 No.7 Bldg. Room 7204	---	---	ISIJ and JIM joint session Titanium and its alloys 1•2 [J1–J6] (9:40–11:50)	ISIJ and JIM joint session Titanium and its alloys 3•4•5 [J7–J17] (13:00–17:00)	ISIJ and JIM joint session Titanium and its alloys 6•7 [J18–J24] (9:20–11:50)	Ti-Ti alloy [281–283] (13:00–14:00)
Session Room 14 No.7 Bldg. Room 7205	Dislocation characterization and properties in stainless steel (9:00–11:50)[Charge-free]	Toward understanding of corrosion- Induced hydrogen absorption to steels in air - Part 1 (13:30–17:00)[Charge-free]	Surface technology and chemical property [231–235] (10:20–12:00)	Hot-dip coating/Mechanism of corrosion and corrosion protection [236–243] (13:00–15:50)	---	Present conditions and maintenance for aging infrastructure III (13:00–16:30)[Charge-free]
Session Room 15 No.7 Bldg. Room 7202	Cutting edge of steel informatics -1 (9:00–17:00)[Charge-free]		Cutting edge of steel informatics - 2 (9:00–11:30)[Charge-free]	Brittle and ductile fracture 1•2 [244–250] (14:00–16:30)	Deepening of understanding of brittle crack propagation behavior of steels and new approach for high arrestability (9:00–12:30)[Charge-free]	---
Session Room 16 No.7 Bldg. Room 7201	New views of microstructural mechanics for strength and fracture of materials based on X-ray and neutron analysis (10:00–16:55)[Charge-free]		Phase interface science to elucidate the interaction of material and microorganism II (10:00–16:30)[Charge-free]		Light elements in steels - New insights and developments by cutting - edge techniques (9:00–15:50)[1,000yen]	
Session Room 17 No.7 Bldg. Room 7203	---	Characterization of free-MgO in steelmaking slag (13:00–17:00)[Charge-free]	Elemental analysis 1 [284–288] (10:00–11:40)	---	Elemental analysis 2/ Structural analysis [289–294] (9:30–11:40)	---
JIM-Session Room A No.5 Bldg. Room 5108	---	---	ISIJ and JIM joint session Ultrafine grained materials -fundamental aspects for ultrafine grained structures- [J25–28] (10:25–11:45)	---	---	---
*Ceremony of conferment of the honorary membership and prize awarding, Special lecture meeting (14:00–17:00 at No.1 Bldg. Room 1101) *Banquet (18:00–20:00 at Cafeteria(2nd fl.)) [7,000yen]			*Poster Session for Students (12:00–15:00 at Cafeteria(3rd fl.)) *ISIJ Beer Party (17:30–19:00 at Cafeteria(2nd fl.)) [1,000yen]			

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

\* Board Meeting:  
Instrumentation, Control and System Engineering March 20(Tue.) 12:00–13:00 Session Room 7  
Processing for Quality Products March 21 (Wed.) 12:00–13:00 Session Room 8

# Program of the 175<sup>th</sup> ISIJ Meeting (March 19-21, 2018)

## High Temperature Processes

Lecture No. Discussion Sessions	Title	Speaker	Page
<b>Research and development of technique elements aiming for new-cokemaking process</b>			
9:40-10:15			
D1	Reforming of low rank coal by chemical upgrading	T. Takanohashi	1
10:15-10:50			
D2	Production of cokes utilizing brown coals depolymerized by wet oxidation	R. Ashida	3
10:50-11:25			
D3	Preparation of coke from non-/slightly-caking coal by a sequence of pulverization, briquetting and carbonization	J. Hayashi	5
12:30-13:05			
D4	Production of high strength cokes from low quality coals chemically-modified with thermoplastic components	N. Tsubouchi	7
13:05-13:40			
D5	Quantitative correlations between chemical structure of char and gas evolution characteristics of coal upon heating	K. Norinaga	9
13:40-14:15			
D6	Effect of heating pattern on coke strength of solvent upgraded low rank coals	A. Sharma	11
14:30-15:05			
D7	Evaluation of appropriate heating condition and reforming effect for each coal type	H. Fujimoto	13
15:05-15:40			
D8	Impact of heating rate on expansion ratio of coal during heating process by means of theoretical model of bubble nucleation, growth and coalescence	K. Taki	15
15:40-16:15			
D9	Evaluation of new briquette in carbonization	Y. Saito	17

## Environmental, Energy and Social Engineering

Lecture No. Discussion Sessions	Title	Speaker	Page
<b>SMART research group final report: Development of innovative ironmaking system with carbon and materials recycling</b>			
9:00-9:30			
D10	(Keynote Lecture) Future prospect for the smart iron making system research group activity	A. Fujibayashi	19
9:30-10:00			
D11	Effect of CCPP operation state on the surplus blast furnace gas system	H. Han	20
10:00-10:30			
D12	Summary of CO <sub>2</sub> emission reduction by sustainable iron and steel making system based on material and recycling technologies (SMART)	T. Nakagaki	23
10:30-11:00			
D13	Development of kinetic mathematical model for evaluating carbon recycling ironmaking furnace	N. Maruoka	25
11:00-11:30			
D14	Development of large-surface area solid oxide electrolysis cell for carbon dioxide electrolysis	Y. Numata	27
11:30-12:00			
D15	Selective electroreduction of CO <sub>2</sub> to CO by a new Co-N-C electrocatalyst	I. Yamanaka	28
13:00-13:30			
D16	Process engineering for control and dynamic states in SMART furnace refining reactions	Y. Matsui	30
13:30-14:00			
D17	Coal gasification reaction with CO <sub>2</sub> gas and steelmaking slag	H. Matsuura	32
14:00-14:30			
D18	Coupling phenomenon between reduction of iron ore and gasification of coke and behavior of water gas shift reaction	Y. Kashiwaya	35
15:00-15:30			
D19	Effect of effective reaction interface area of carbonaceous material on carburization melting behavior during contacting condition between iron and carbon sample under load	K. Ohno	37
15:30-16:00			
D20	Thermodynamics analysis on the removal of tramp elements in iron	H. Ono	40

# Program of the 175<sup>th</sup> ISIJ Meeting (March 19-21, 2018)

## Processing for Quality Products

Lecture No. Discussion Sessions	Title	Speaker	Page
<b>Advances in material modeling for the forming simulations of steel sheets</b>			
<b>13:10-14:00</b>			
D21	(Invited Lecture) Development of experimental evaluation methods of work-hardening behavior and material modeling for steel sheets	S. Shirakami	· · · 42
<b>14:00-14:20</b>			
D22	Toward improvement of accuracy of crystal plasticity analysis by using oligocrystal	T. Hama	· · · 46
<b>14:20-14:40</b>			
D23	(Sawamura Award) Development of biaxial tensile test system for in-situ scanning electron microscope and electron backscatter diffraction analysis	M. Kubo	· · · 47
<b>14:40-15:00</b>			
D24	Hydraulic bulge forming simulation using a material model based on crystal plasticity simulation	T. Hakoyama	· · · 51
<b>15:10-15:30</b>			
D25	Verification of yield functions by tensile tests with rotated principal axes	R. Ageba	· · · 52
<b>15:30-15:50</b>			
D26	(ISIJ Research Promotion Grant) Hole expanding simulation by spline yield function	H. Tsutamori	· · · 56
<b>15:50-16:10</b>			
D27	The hole expansion forming simulation for a cold rolled steel sheet by material modeling using multiaxial stress tests	H. Nakano	· · · 60
<b>16:10-16:30</b>			
D28	Hole expansion simulation of high-strength steel sheets	H. Hamasaki	· · · 61
<b>16:30-16:50</b>			
D29	Measurement of the strength differential effect of DP980 steel sheet and experimental validation using pure bending test	T. Maeda	· · · 63
<b>Current research and development in cold rolling</b>			
<b>13:05-13:35</b>			
D30	In situ measurement of contact resistance between rolls and workpiece during cold rolling	H. Utsunomiya	· · · 64
<b>13:35-14:05</b>			
D31	Fundamental study of lubrication characteristics of high strength steel in cold rolling	M. Shimura	· · · 68
<b>14:05-14:35</b>			
D32	Simulation of the cross buckling and the longitudinal buckling in cold rolling	K. Komori	· · · 71
<b>14:45-15:15</b>			
D33	Effect of outlet angle to buckling behavior during thin sheet rolling	T. Okazaki	· · · 72
<b>15:15-15:45</b>			
D34	Development of curling control mechanism for cold twelve-high rolling mill (KT mill)	T. Miyazono	· · · 74
<b>15:45-16:15</b>			
D35	(Invited Lecture) Precision cold-rolling technology and its application to development of new products	S. Tanaka	· · · 76



# Program of the 175<sup>th</sup> ISIJ Meeting (March 19-21, 2018)

## International Organized Sessions

### High Temperature Processes

#### Approach of steelmaking to mitigating climate change

Session organizer : R. Inoue [Akita Univ.], F. Tsukihashi [The Univ. of Tokyo]

9:30-9:35

Opening Address: F. Tsukihashi [The Univ. of Tokyo]

Chair: R. Inoue [Akita Univ.]

9:35-10:05

**Int.-1** Experimental research on the dust emission of multiple raw materials in the stockyard of a steel plant

Tongji Univ. ○H. Li · H. Yang, Baoshan Iron & Steel W. Wei · Y. Zhang

· · · 80

10:05-10:35

**Int.-2** Recycling of steelmaking slag and dust for sustainable steel production

The Univ. of Tokyo ○H. Matsuura

· · · 84

10:45-11:15

**Int.-3** (Invited Lecture) Approach of heat recovery from BF slag and CO<sub>2</sub> absorption by steelmaking slags in China

Wuhan Univ. of Science and Technology ○G. Li · G. Ma

· · · 88

11:15-11:45

**Int.-4** (Invited Lecture) The use of recycled stainless steel slags to replace lime for neutralization of acid baths

Royal Institute of Technology ○P. Jönsson · M. Colle · A. Gauffin · A. Karasev · G. Renman,  
Sandvik Materials Technology O. Sundqvist, Outokumpu Stainless AB G. Ruist

· · · 92

Chair: F. Tsukihashi [The Univ. of Tokyo]

13:00-13:30

**Int.-5** Prevention of alkaline dissolution from steelmaking slag

Akita Univ. ○R. Inoue · S. Yamashita

· · · 95

13:30-14:00

**Int.-6** (Invited Lecture) Modernization scenarios for iron and steel industry towards meeting the climate change mitigation target

National Metallurgical Academy of Ukraine ○V. Shatokha

· · · 99

14:00-14:30

**Int.-7** (Invited Lecture) Hydrogen utilization for a clean and sustainable ironmaking future

Yonsei Univ. ○D. Min · W. Kim · S. Shin

· · · 103

14:40-15:10

**Int.-8** CO<sub>2</sub> ultimate reduction in steelmaking process (COURSE50 Project)

Nippon Steel & Sumitomo Metal ○K. Araki

· · · 106

15:10-15:40

**Int.-9** Near-net-shape casting process and microstructure evolution toward reduction of CO<sub>2</sub> emission and utilization of steel scrap

Tokyo Tech ○Y. Kobayashi

· · · 110

15:40-15:45

Closing Remark: R. Inoue [Akita Univ.]

# Program of the 175<sup>th</sup> ISIJ Meeting (March 19-21, 2018)

## High Temperature Processes

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2	Deterioration of parmanent bricks for hot metal ladle	K. Yamada	115
3	Improvement of Ladle Life at Kimitsu Steel Works 1	Y. Iio	116
4	Strengthening of Fiber Block support structure	T. Matsumoto	117
5	Improvement of converter combined blowing technology in No.2 SMP at Baosteel	X. Jiang	118
<b>Thermodynamics 1</b>			
6	(Nishiyama Commemorative Prize) Purification of silicon by using steel making technology	K. Hanazawa	119
7	Removal of boron from Si-Cu alloy utilizing the CaO-Na <sub>2</sub> O-SiO <sub>2</sub> flux system	W. Fukada	120
8	Removal of phosphorus from Si-Ca alloy by flux treatment and solidification refining	R. Kawamoto	121
9	Measurement of thermodynamics properties of oxygen in M-O system by electrical method using zirconia solid electrolyte	J. Li	122
<b>Thermodynamics 2</b>			
10	(Nishiyama Commemorative Prize) Research on the new production process on silicon and single crystalline silicon carbide using liquid-alloying method	T. Yoshikawa	123
11	Two-step viscosity temperature dependency for CaO-SiO <sub>2</sub> -Al <sub>2</sub> O <sub>3</sub> -Na <sub>2</sub> O-B <sub>2</sub> O <sub>3</sub> system	Y. Sasaki	124
12	Ca deoxidation measurement of molten Fe-Ni-Cr alloy	K. Takahashi	125
13	(ISIJ Research Promotion Grant) Measurement on the interaction parameter between Co and Al in high Al molten steel	N. Lyu	126
14	Measurement of activity coefficients of Mn and P in C saturated Fe-Mn-P alloy	D. Shin	127
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15	Effect of surface tension of semi-coke on adhesive strength of coal particles	M. Nagayama	128
16	Coke pore structure analysis using X-ray CT	D. Anraku	129
17	Effect of inhibition of dilatation by low rank coal on coke strength	S. Konno	130
18	Grind ability on the blend coal in an impact hammer mill	S. Okutani	131
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19	The optimum design in coke oven pad-up	Y. Nakai	132
20	3D measurement techniques for coke oven chamber walls at operating temperature	T. Fujita	133
21	Equipment maintenance policy of COG by-product plant	Y. Fujita	134
22	Disaster prevention measures for charging car	T. Hara	135
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23	(Shiraishi Commemorative Prize) Numerical simulation of multiphase flow in refining process	O. Nakamura	
24	(ISIJ Research Promotion Grant) Turbulent coagulation of poly-dispersed particles in liquid	H. Arai	136
25	Theoretical calculation on force balance and removal behavior of inclusions in tundish	H. Pan	137
26	Removal of various typed inclusions during RH refining in low carbon Al-Killed steel	D. Zhao	138
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27	(ISIJ Young Researcher Award) Mathematical model study of dispersed phase and interfacial flow of melt in metallurgical process	S. Natsui	
28	Analysis of the surface reaction at the interface beteen hematite and silicon based materials	N. Ishikawa	139
29	Dissolution of pre-oxidized Zircaloy-4 alloy in 304 stainless steel-B <sub>4</sub> C melt at 1300 °C	L. Zheng	140

## Program of the 175<sup>th</sup> ISIJ Meeting (March 19-21, 2018)

### Cutting-edge approaches by multidiscipline fields for comprehension of high temperature phenomena and materials design Vol.2-1

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31 Measurement of thermal diffusivity of FeO scale without compositional change at high temperature by electrical-optical hybride pulse-heating method	Y. Yang	. . .	142
32 Correlations between excess volume and thermodynamic functions for Au-X melts (X = Cu, Pd, Ni)	M. Watanabe	. . .	143
33 (Sawamura Award) Dynamic changes in interfacial tension between liquid Fe alloy and molten slag induced by chemical reactions	M. Suzuki	. . .	144

### Cutting-edge approaches by multidiscipline fields for comprehension of high temperature phenomena and materials design Vol.2-2

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### Cutting-edge approaches by multidiscipline fields for comprehension of high temperature phenomena and materials design Vol.2-3

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44 Effective utilization of dust and sludge as iron-bearing agglomeration agent in iron ore sintering process	T. Shima	. . .	155
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48 Evaluation of the property of the cohesive zone under N <sub>2</sub> -less condition	Y. Kawashiri	. . .	159
49 Effort of furnace body long-life of No.6 Blast Furnace at Chiba Works	K. Fukada	. . .	160

### Softening and melting behavior

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51 Seepage behaviour of molten slag from the partially reduced sintered ore in the cohesive zone	Y. Sasaki	. . .	162
52 (ISIJ Research Promotion Grant) Numerical simulation of softening and melting behavior using ADEM-SPH	S. Ishihara	. . .	163

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55 Permeability analysis in lower part of blast furnace considering consumption of small coke	Y. Kashihara	. . .	166

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## Reduction of iron oxide

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57 Effect of iron ore characteristics on reduction of carbon-iron ore composite under high pressure	T. Murakami	• • •	168
58 (ISIJ Research Promotion Grant) Effect of solid solution amount of MgO on reducibilities of magnetite and wustite in a blast furnace	B. Cai	• • •	169

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