

# The Timetable of the 162<sup>nd</sup> ISIJ Meeting

	Sep.20 (Tues.)		Sep.21 (Wed.)		Sep.22 (Thurs.)	
	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.
Room1 (R1-211)	Ironmaking process enabling low energy consumption1·2 [1-8] (9:10-12:00)	Blast furnace and shaft furnace /Facility and refractories1 [9-17] (13:00-16:10)	Young engineer in ironmaking1 /Young engineer session of coke-making1 [52-60] (9:00-12:10)	Young engineer session of coke-making2 /Young engineer in ironmaking2 [61-70] (13:10-16:40)	Numerical simulation for blast furnace1·2 [122-127] (9:30-11:40)	-----
Room2 (R1-212)	Slag and dust treatment ·CO <sub>2</sub> reduction1·2 [18-24] (9:20-11:50)	Development of in-situ observation technique for steel solidification and its application (13:00-16:30) [Charge-free]	-----	Sintering1·2·3 [71-80] (13:00-16:30)	Cokemaking process /Reactivity and property of coke [128-134] (9:20-11:50)	Gasification [135-139] (13:00-14:40)
Room3 (R1-213)	Thermodynamics1·2 [25-32] (9:00-11:50)	Fundamentals and application of special steel refining technology 1·2·3·4 [33-43] (13:00-17:00)	Conventional continuous casting1·2 ·Refractories2 [81-88] (9:00-11:50)	Converter·secondary refining1·2 /Inclusion·stainless [89-100] (13:00-17:20)	Hot metal treatment /Refractories3 [140-147] (9:00-11:50)	Transport phenomena1·2 /Prospect of the utilization of new phases to steel-refining1·2 [148-157] (13:00-16:30)
Room4 (R1-214)	Functions of electromagnetic fields in materials processing1·2 [44-51] (9:00-11:50)	-----	Physico-chemical properties of molten matter for high temperature processing1·2 [101-108] (9:00-11:40)	Physico-chemical properties of molten matter for high temperature processing3·4·5 /Properties of liquid materials [109-121] (12:40-17:10)	Introduction of novel processing forum activity1·2 [158-163] (10:00-12:00)	Microwave processing [164-167] (13:00-14:20)
Room5 (R1-311)	Exploring a low carbon sintering process –Aiming at the reduction of 100 kg-CO <sub>2</sub> /Fe-ton– (9:30-17:00) [1,000yen]		Fundamentals and applications of non-metallic inclusions in solid steel (9:15-16:45) [Charge-free]		Continuous casting·solidification1·2 [168-175] (9:00-11:50)	Solidification and structure control1·2·3 [176-186] (13:00-17:00)
Room6 (R1-312)	Gas separation·waste heat utilization /Slag utilization [187-192] (9:20-11:30)	New aspects of steel research and development under resource and environmental restrictions (13:00-16:30) [1,000yen]	Iron and steel material cycle and rare metals flow [193-196] (10:00-11:20)	Pyrometallurgy based separating & recycling (13:00-17:00) [2,000yen]	Development on the Novel Functions of Steelmaking Slags -Utilization for Marine Environment- (9:30-16:20) [1,000yen]	
Room7 (C1-211)	-----	-----	(D) Production of green energy and the use for ironmaking and steelmaking [D1-12] (9:10-17:00)		(Int.) Ancient and pre-modern production of iron and non-ferrous metals [Int.1-13] (8:45-17:00)	
Room8 (C1-111)	(D) Process control achieving sustainable and fault-tolerant production [D13-17] (9:30-12:00)	(D) Modeling and control to realize the deviation-free production [D18-23] (13:30-16:40)	(D) Advanced system integration for preserving, sharing and improving work quality in steel plants [D24-28] (9:20-12:00)	Instrumentation /System [197-202] (13:00-15:00)	-----	-----
Room9 (U2-211)	Numerical model /Interaction between tool and work materials for superior machinability [203-209] (9:30-12:00)	Cooling·hot-dip coating /Rolling·cooling /Skin pass rolling [210-220] (13:00-17:00)	(D) Cooling technologies for the controlling of microstructure and mechanical properties [D29-35] (9:30-16:20)		(D) State-of-the-art technology and challenges for new corrosion resistant steel tubes & pipes and its manufacturing process [D36-40] (9:00-12:00)	-----
Room10 (U2-212)	-----	Compaction & sintering of powder & particulate1·2 [221-229] (13:00-16:10)	Friction welding and friction stir welding of steel /Tribology and joining [230-236] (9:00-11:30)	Today and future outlook of long life/life extension technologies of steel structures (13:00~17:10) [Member:2,000yen, Non-member:3,000yen]	(D) Approach for the elucidation of metallurgy and effect in processing of an oxide scale [D41-50] (9:30-15:40)	
Room11 (U2-214)	Hydrogen embrittlement1·2 [237-244] (9:00-11:50)	Hydrogen embrittlement3·4 /Fatigue [245-255] (13:00-17:00)	Fatigue and fracture /Deformation behavior [306-313] (9:00-11:50)	Fracture1·2 /Stress analysis [314-324] (13:00-17:00)	Deformation and fracture of DP steel /Microstructure and mechanical properties of bainite, martensite, residual austenite steel [367-374] (9:00-11:50)	Mechanical properties of ferrite steel /Strengthening and hardening of precipitation, dispersion and aging [375-382] (13:00-15:50)
Room12 (U2-213)	Phase transformation·diffusion /Phase equilibria·phase diagram [256-261] (9:00-11:10)	Steels for energy application [262-265] (14:00-15:20)	-----	Ni-base super alloy1·2·3 [325-333] (13:00-16:20)	Heat resisting steel1·2 [383-390] (9:00-11:50)	Heat resisting steel3·4 [391-397] (13:00-15:30)
Room13 (U2-311)	Overview for perspectives and problems of materials and process design toward resource saving and circulating society (8:45-12:15) [Charge-free]	Structural steel1·2 [266-273] (14:10-17:00)	Toward effective 3D4D analysis for materials research (9:00-16:40) [1,000yen]		Common bases for hydrogen embrittlement studies (9:00-16:50) [2,000yen]	
Room14 (U2-312)	-----	Hot-dip coating /Mechanism of corrosion and corrosion protection /Resistance to oxidation ·chemical conversion treatment [274-284] (13:00-17:00)	Fundamentals and novel approaches for new demands on work-hardening properties of steels (8:45-17:30) [4,000yen]		Effect of biofilm and bacteria on the material characteristics (10:00-17:00) [1,000yen, Student:Charge-free]	
Room15 (M1-214)	Texture /Prediction and analysis [285-292] (9:00-11:50)	Aging·precipitation /Recovery·recrystallization [293-300] (14:00-16:50)	-----	Electrical steels1·2·3 [334-342] (13:00-16:20)	Cold rolled strip and sheet1·2 [398-402] (10:00-11:50)	Hot rolled strip and sheet1·2 [403-408] (13:00-15:10)
Room16 (M1-313)	(D) Evaluation and application of retained austenite in steel [D51-59] (9:00-14:15)		Diffusional and diffusionless transformation1·2 [343-350] (9:00-11:50)	Diffusional and diffusionless transformation3·4 [351-358] (13:00-15:50)	(D) Recent developments and perspective of analysis techniques for evaluating microstructures and properties [D60-69] (9:10-15:30)	
Room17 (M1-311)	-----	Stainless steels1 [301-305] (15:00-16:40)	Stainless steels2·3 [359-366] (9:00-11:50)	Science and Latest Technologies of Stainless Steel PART1 (13:00-16:50) [Charge-free, Textbook:3,000yen]	Titanium and its alloys 1·2 [409-414] (9:50-12:00)	Titanium and its alloys 3 [415-417] (13:00-14:00)
Room18 (C1-311)	-----	Surface and state analysis /Elemental analysis [418-426] (13:40-16:50)	(Int.) Neutron: as a tool for developing miracle steel -1 [Int.14-27] (9:00-17:10)		Basic aspects and applications of nonmetallic inclusion evaluation (9:00-15:00) [Charge-free]	

Poster session for students (12:00-15:00, U3-311)  
 ISIJ beer party (17:30-19:00, Cafeteria "Famille")  
 Banquet (18:00-20:00, Restaurant "La Scena" in Osaka Univ.) [5,000yen]

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

Board Meeting:  
 Process Evaluation and Material Characterization  
 Sep.20 (Tues.) 12:30-13:30 Room 18

## High Temperature Processes

Lecture No. Plenary Session	Title	Speaker	Page
1	Influence of mixing ferro coke on blast furnace simulated reaction behavior in a packed mixed bed-III	T.Ueno	• • • 746
2	Effect of hydrogen on reduction behavior of coke mixed layer	Y.Kashihara	• • • 747
3	Influence of lowering thermal reserve zone temperature on reduction rate of wustite-II	Y.Miyamoto	• • • 748
4	Refined powder iron and its manufacturing method	T.Misao	• • • 243
5	Influence of mixing coke on blast furnace simulated reaction behavior in a packed mixed bed	H.Suzuki	• • • 749
6	Effect of H <sub>2</sub> -H <sub>2</sub> O gas on the reduction and disintegration behaviors of sinter	Y.Kamiya	• • • 750
7	Influence of gaseous sulfur on carburization rate to iron in CO-H <sub>2</sub> mixtures-II	T.Hashimoto	• • • 751
8	Influence for combustibility of pulverized coal by adding hydrogen gas	Y.Okamoto	• • • 752
9	Evaluation of sinter reducibility and coke reactivity by experimental blast furnace	T.Natsui	• • • 185
10	Scrap-melting operation by shaft furnace using all conventional-size BF coke and steel scrap	A.Shinotake	• • • 753
11	Characteristics of formation and dissolution of kish graphite in blast furnace hearth	H.Fukuoka	• • • 754
12	Probing the inside of blast furnace by cosmic-ray Muon radiography using nuclear emulsion	A.Shinotake	• • • 755
13	Local blockage of fine particles transported by updraft through a packed bed	H.Kawai	• • • 756
14	Verify of HNO <sub>3</sub> stress corrosion cracking theory by entity specimen analysis (Analyze of stress corrosion cracking of hot blast stove shell-1)	Y.Satoh	• • • 350
15	Proposition of HNO <sub>3</sub> -H <sub>2</sub> SO <sub>4</sub> -HCl stress corrosion cracking theory by experiment verification (Analyze of stress corrosion cracking of hot blast stove shell-2)	Y.Satoh	• • • 351
16	Dissolution of refractory by change of carbon solubility of liquid iron in blast furnace hearth	Y.Shiraishi	• • • 757
17	Relation between expansion behavior and bonding of silica mortar	A.Kasai	• • • 125
18	Acceleration of CO <sub>2</sub> absorption rate of Li <sub>2</sub> ZrO <sub>3</sub> by B <sub>2</sub> O <sub>3</sub> doping	N.Tokuda	• • • 758
19	Evaluation for the activity of MnS and FeS, and the distribution of Fe and Mn between Fe-Mn-O-S melts and molten slags	S.J.Kim	• • • 759
20	Dephosphorization behavior in steelmaking slag reduction at high temperature	K.Nakase	• • • 760
21	Reduction of ZnO in lime treated EAF dust with solid iron powder	R.Chairaksa	• • • 761
22	Solidification condition of steelmaking slag by cooling roll (COURSE50 development of heat recovery system from steelmaking slag-1)	H.Tobo	• • • 762
23	Effect of slag shape on sensible heat recovery ratio (COURSE50 development of heat recovery system from steelmaking slag-2)	Y.Ta	• • • 763
24	Development of roll type continuous slag solidification process (COURSE50 development of heat recovery system from steelmaking slag-3)	Y.Hagio	• • • 764
25	Dissolution behavior of sulfur in ternary silicate slags	Y.B.Kang	• • • 765
26	Effect of chromium on phosphorus in carbon saturated Fe-Cr-P melt	M.K.Paek	• • • 766
27	Solubility of MgO and Fe <sub>2</sub> O <sub>3</sub> equilibria in CaO-Fe <sub>2</sub> O <sub>3</sub> -MgO-SiO <sub>2</sub> (≤5mass%)-ΣM <sub>x</sub> O <sub>y</sub> slag system	D.Y.Shin	• • • 767
28	The thermodynamic properties of niobium carbonitride at 1623K	Y.Nara	• • • 768
29	Experimental investigation on the phase equilibria in the Mn-V-O system	M.S.Kim	• • • 769
30	Thermodynamic properties of the Cu <sub>2</sub> S-MnS binary system	L.Yun	• • • 770
31	Rhodium dissolution behavior in the Na <sub>2</sub> O-SiO <sub>2</sub> and the CaO-SiO <sub>2</sub> slag systems	C.Wiraseranee	• • • 118
32	Phase relations for the Si-Sn-B system at 1673 K	X.Ma	• • • 771
33	Fluorite-free refining on alloy-400	T.Kawamoto	• • • 113
34	Reduction of slag treatment cost by slag hot recycling process	K.Sakata	• • • 213
35	The improvement of lining life by bottom-tuyere-changing of EAF for stainless steel	N.Nukushina	• • • 217
36	Mathematical expression on deoxidation equilibria of special steels by Redlich-Kister polynomial	T.Miki	• • • 210
37	Reduction of hydrogen content in ESR ingot	J.Sato	• • • 212
38	Equilibrium relationship between the oxide compounds in MgO-Ti <sub>2</sub> O <sub>3</sub> -Al <sub>2</sub> O <sub>3</sub> and iron	T.Ibata	• • • 772
39	Calculated phase diagrams of non-metallic inclusions in steels and its applications	K.Oikawa	• • • 207
40	Removal of nonmetallic inclusions by gas stirring on ladle refining processes	H.Motomura	• • • 209
41	Evaluation of largest inclusions in Al killed type 304 stainless steel by using statistics of extreme values	Y.Kambe	• • • 208
42	Effect of flow of molten iron on mass and heat transfer between molten iron and solid iron	K.Isobe	• • • 773
43	Improvement of bloom surface quality by optimizing mold oscillation parameters in continuous casting	M.Shiratori	• • • 218
44	(ISIJ Research Promotion Grant)Thermal analysis for Fe-C binary alloys in high magnetic fields	K.Koyama	• • • 774

45 Discussion on kinetics of martensitic transformations	T.Fukuda	• • •	775
46 Effect of magnetic field imposition on ZnTe electro-deposition from a citric acid electrolyte	T.Kozuka	• • •	776
47 Effects of a high magnetic field on solid/solid phase transformation behavior and transformed structures in Fe-based alloys	H.Ohtsuka	• • •	777
48 Impact of magnetic annealing on grain boundary segregation and mechanical properties in Fe-Sn and Fe-P dilute alloys	K.Sonoda	• • •	778
49 Imposition of electromagnetic vibration on 18Cr-8Ni stainless steel during its solidification	T.Nishimura	• • •	779
50 Microsegregation of a Sn-Pb alloy with and without electromagnetic vibration	R.Tokushige	• • •	780
51 Fabrication of Al-Si semi-solid slurry by cup cast method with electromagnetic stirring	Y.Takado	• • •	781
52 Development of visualization system of sintering machine-1	M.Yano	• • •	782
53 Development of the visualization system of sintering machine-2	T.Shinohara	• • •	783
54 Influence of coke breeze addition timing on sinter quality	Y.Arikata	• • •	784
55 Installation capacity enhancement of Oita No.1 sintering machine	Y.Tokunaga	• • •	107
56 Development of technique that efficiently uses space in the yard	S.Kashimura	• • •	105
57 Development of coke chamber wall monitoring system	T.Yoshihara	• • •	785
58 The problem and countermeasure against rising extrusion load	S.Koge	• • •	786
59 A blockade preventive countermeasure of desulfurizing tower	M.Taniguchi	• • •	787
60 Numerical analysis of dust diffusion from coke oven plant	N.Saito	• • •	788
61 Effect of coal moisture and bulk density on shrinkage of coke	A.Kotani	• • •	789
62 Effect of asphalt pitch addition on coke pore structure	Y.Hayashi	• • •	145
63 Valuation of sulfur distribution in coke manufacturing	Y.Ono	• • •	790
64 Development of deposit carbon control technique in coking chamber	T.Niinou	• • •	147
65 Development of heat transfer model in coke oven battery with operation schedule	K.Terui	• • •	791
66 Segregation behavior of nut coke under high coke rate condition of coke mixing in ore layer	N.Uchida	• • •	109
67 Study of mechanism of burden distribution formation by scale model (Development of burden distribution control technology-1)	M.Kadowaki	• • •	110
68 Development of simulation tool for analyzing particle behavior in charging system of blast furnace by using DEM (Development of burden distribution control technology-2)	H.Mio	• • •	111
69 Development of blast furnace reaction simulator combining experiment and mathematical model	T.Hirosawa	• • •	108
70 Long-term low productivity operation and transition to high productivity at Kokura No.2 blast furnace	T.Taniguchi	• • •	112
71 Void structure of granulated raw material bed with dry particles addition (Development of RF-MEBIOS(return fine mosaic embedding for iron ore sintering method) process-4)	Y.Yamaguchi	• • •	195
72 Effect of installed RF-MEBIOS process at Kashima No.3 sinter plant (Development of RF-MEBIOS process-5)	Y.Nakagawa	• • •	196
73 Plant test of optimizing coke breeze coating condition at HPS process	T.Higuchi	• • •	792
74 Production of carbon included sinter ore and evaluation of its reactivity in blast furnace atmosphere	C.Kamijo	• • •	194
75 Effect of solid phase/melts ratio on melting properties of iron ore during sintering process	Y.Pei	• • •	793
76 Application of ludwigite in iron ore sintering process in Shougang	Y.Pei	• • •	794
77 Development of pot test with segregation charging (Improvement of pot test-II)	M.Hara	• • •	795
78 Effect of localized vertical slit in sintering bed on sinter strength	T.Yamamoto	• • •	796
79 Effect of diameter of metallic agglomeration agent on permeability of sintering bed	K.Fujino	• • •	797
80 Effect of cooling rate on minerals of iron ore sinter	J.Kato	• • •	798
81 High speed casting technology of hypoperitectic steels for round billet caster	T.Mukai	• • •	799
82 Distribution of defects in slab and suppression of unbalanced flow by electromagnetic brake	K.Furumai	• • •	800
83 Analyses of surface defects on the hot dip galvanized sheets for car body panels	J.Yang	• • •	801
84 Numerical analysis of mold flux behavior at meniscus during continuous casting	E.Y.Ko	• • •	182
85 Reduction of narrow face bulging at Kimitsu No.6 continuous caster	M.Sakamoto	• • •	802
86 Construction and operation of the Fukuyama No.7 continuous casting machine at West Japan works, JFE steel corp	Y.Hori	• • •	803
87 Adhesion control of the tundish on the hot-cycle operation	H.Onoda	• • •	126
88 Development of anti-alumina-clogging materials characterized by reaction with molten steel (2 <sup>nd</sup> report)	M.Ogata	• • •	121
89 High efficient dephosphorization technique in decarburization converter utilizing FeO dynamic control	Y.Ogasawara	• • •	163
90 Effect of top blowing conditions and temperature on post combustion in BOF	A.Kaizawa	• • •	804
91 Investigation of the bath flow in Q-BOP with water model experiment	F.Ogasawara	• • •	161
92 Construction and operation of new steelmaking plant at Sumitomo metals(Kokura) (Innovative steelmaking process for specialty steel-1)	T.Mori	• • •	805

93 Improvement in ultra clean steel making process at Sumitomo metals (Kokura) (Innovative steelmaking process for specialty steel-2)	R.Hirooka	• • •	806
94 Development of dynamic decarbonization model of RH in Baosteel	Z.Ma	• • •	807
95 Changes in nitrogen and sulfur composition in liquid steel during blowing CaO-CaSi flux powder under reduced pressure	M.Numata	• • •	808
96 Effect of arc on the quality of molten steel in LF	J.H.Lee	• • •	809
97 Fundamental study on inclusion-removal process from aluminum with electromagnetic cyclone collector	J.Hui	• • •	810
98 Turbulent coagulation of particles in molten metal	T.Li	• • •	811
99 Formation of inclusions in Fe-Al-Ti steel at 1473K	W.Choi	• • •	812
100 Influence of lime-stone on carbon concentration of stainless steel	Y.Kang	• • •	813
101 (Invited Lecture)Non-contact measurement of viscosity of oxide melts using electric-field tweezers	S.Fujino	• • •	814
102 Viscosity estimation of multicomponent slag by revised quasi-chemical viscosity model	M.Suzuki	• • •	815
103 A modification of viscosity model based on structural information of CaO-SiO <sub>2</sub> -Al <sub>2</sub> O <sub>3</sub> -R <sub>2</sub> O slags	S.Sukenaga	• • •	232
104 Viscosity evaluation of aggregated particles dispersed suspension	S.Haruki	• • •	816
105 Ascent of crystallizing speed of high viscosity mould flux (Crystallization of perovskite and melilite-1)	Y.Tsukaguchi	• • •	817
106 Measurement of crystallization of mould flux by capacitance method (Crystallization of perovskite and melilite-2)	Y.Ohta	• • •	818
107 Iron oxide concentration change in mould flux for continuous casting	M.Wang	• • •	230
108 Effect of Fe <sup>2+</sup> /Fe <sup>3+</sup> on the viscosity of iron oxide containing silicate slag	Y.Inatomi	• • •	819
109 Thermal conductivity measurements of Ge-Sb-Te alloys by hot strip method	R.Lan	• • •	222
110 Normal spectral emissivity measurement of liquid Fe-Ni alloys using an electromagnetic levitation in a dc magnetic field	H.Kobatake	• • •	820
111 Heat capacity measurement for liquid Fe-Ni alloys using the noncontact laser modulation calorimetry	K.Sugie	• • •	821
112 (ISIJ Research Promotion Grant)Density and local structure of liquid Fe-Si alloys	A.Mizuno	• • •	822
113 Density measurement of liquid alloys by using electromagnetic levitation technique combined with static magnetic fields	M.Watanabe	• • •	823
114 Surface tension measurements of Fe-C-O melt using a gas/liquid equilibrium method	K.Morohoshi	• • •	824
115 Dynamic surface tension behavior of liquid iron during carburization-decarburization processes	K.Morohoshi	• • •	825
116 Influence of silicone content on surface tension of molten steel	S.Ozawa	• • •	826
117 Viscosity of molten sodium and potassium	Y.Sato	• • •	827
118 Sound velocity dispersion of molten alkali disilicates	Y.Kitamura	• • •	828
119 The relation between thermal conductivity and NBO/T for R-Na <sub>2</sub> O-SiO <sub>2</sub> (R=Al <sub>2</sub> O <sub>3</sub> ,CaO) melts	T.Kawatari	• • •	829
120 Viscosity measurement of molten InGaSb using high temperature oscillating viscometer	M.Mukai	• • •	830
121 Numerical simulation of liquid drops motion by moving particle semi-implicit method	S.Natsui	• • •	831
122 Influence of gas volume and BF inner volume on gas penetration at shaft gas injection	T.Ariyama	• • •	189
123 Numerical simulator-based design of layered burden structure for efficient BF-gas utilization	M.Kuwabara	• • •	832
124 Numerical simulation on liquid flow in coke bed by MPS method	T.Kon	• • •	833
125 Evaluation of DEM-CFD simulation of heat and mass transfer in packed bed	S.Natsui	• • •	834
126 Modeling of softening behavior of sinter for blast furnace	H.Kurosawa	• • •	835
127 Gas-flow in low coke rate condition of blast furnace with DEM-CFD	S.Matsushashi	• • •	836
128 Effect of coke contraction behavior on coke size	S.Nomura	• • •	837
129 Evaluation of contraction rate of inertinite in coal (Development of technology for producing high strength coke-6)	Y.Kubota	• • •	838
130 Influence of compressibility of coke cake on coke pushing force	T.Nakagawa	• • •	142
131 Development of carbon iron composite process	H.Fujimoto	• • •	839
132 Effect of carbon matrix connectivity at fracture surface on coke strength	N.Sakimoto	• • •	840
133 Relationship between failure load $P_{in}^*$ and drum index (Evaluation of coke strength with materials mechanics approach-2)	H.Hayashizaki	• • •	143
134 Analysis of gasification rate for highly reactive coke with CO-CO <sub>2</sub> gas mixture	T.Nakamura	• • •	841
135 Influence of atmosphere on gasification reaction of reducing agent with Fe or CaO	S.Ueda	• • •	842
136 Effect of material particle size on reduction rate of hematite and quaternary calcium ferrite mixtures	D.Noguchi	• • •	843
137 In-situ X-ray observation of macroscopic coalescence of reduced iron produced from powder mixture of magnetite and carbon black	K.Hara	• • •	844
138 The TEM analysis of the reaction between silica doped wustite and carbon beyond the melting point	N.Ishikawa	• • •	845
139 Carburization of solid iron by graphite	M.S.Shin	• • •	846

140 Effect of vessel bottom inclination on the particle entrainment behavior with mechanical stirring	A.Matsui	• • •	847
141 Improvement of KR process for highly efficient hot metal desulfurization	J.B.Lee	• • •	848
142 Development of dephosphorization with CaO powder top blowing without CaF <sub>2</sub> (Development of dephosphorization with CaO powder top blowing-1)	T.Tanigaki	• • •	157
143 Development of dephosphorization technology using ladle slag with CaO powder top blowing (Development of dephosphorization with CaO powder top blowing-2)	A.Matsumoto	• • •	158
144 Phase relationship of 2CaO·SiO <sub>2</sub> -3CaO·P <sub>2</sub> O <sub>5</sub> solid solution in the CaO-SiO <sub>2</sub> -FeO-P <sub>2</sub> O <sub>5</sub> system at 1673K	X.Gao	• • •	849
145 Fatigue failure behavior of Al <sub>2</sub> O <sub>3</sub> -SiO <sub>2</sub> system bricks under compressive stress	Y.Hino	• • •	122
146 Application of BF slag to refractory castable	R.Otake	• • •	850
147 Application of new hot-gunning repair method to RH snorkel	T.Matsui	• • •	124
148 Effect of ultrasound on dissolution rate of solid into liquid	K.Okumura	• • •	851
149 Development of the simulation program for the refining processes by using the SPH method	S.Fujiya	• • •	852
150 Simulation of the particles impingement on a liquid bath by using the SPH solver	M.Mori	• • •	853
151 A novel method of measuring dynamic surface tension from profile of capillary jet	K.Katoh	• • •	132
152 (ISIJ Research Promotion Grant)Cavity formed by water entry of a superhydrophobic rotating circular cylinder	Y.Ueda	• • •	854
153 (ISIJ Research Promotion Grant)Dependence of partial pressure of oxygen on the distribution ratio between B <sub>2</sub> O <sub>3</sub> flux and Ag	K.Yamaguchi	• • •	855
154 (ISIJ Research Promotion Grant)Oxidative removal of Cu in liquid iron through Ag phase into B <sub>2</sub> O <sub>3</sub> flux	K.Yamaguchi	• • •	856
155 Removal of Cu by solidification of Fe-Cu-C melt	M.Nakamoto	• • •	857
156 Equilibrium between molten iron alloy and solid oxide phase	T.Miki	• • •	858
157 Dissolution reaction of sulfur into liquid calcium	H.Tanigawa	• • •	215
158 Effect of specific surface area and electrical conductivity on complex permittivity of Fe <sub>3</sub> O <sub>4</sub> and $\gamma$ -Fe <sub>2</sub> O <sub>3</sub> powders	M.Hotta	• • •	464
159 Relation between thermal runaway and permittivity of chromium oxide (III) powder and mullite powder in their microwave heating	K.Imazeki	• • •	859
160 Researches on fundamentals and application of microwave processing to materials and environmental technology (2011)	N.Yoshikawa	• • •	860
161 New functions of electromagnetic fields	K.Iwai	• • •	861
162 Effect of ultrasound irradiation on transport phenomena	K.Okumura	• • •	176
163 New trends of in-process technology between ferrous and non-ferrous industries	T.Kozuka	• • •	862
164 High power microwave heating for pig ironmaking	K.Nagata	• • •	863
165 Distribution of impurities contained in iron ore during pig iron making by microwave heating	K.Hara	• • •	864
166 Dehydration behavior of goethite blended with graphite by microwave heating	Y.Saito	• • •	459
167 Permittivity and electric conductivity measurement of FeO(OH)/C powder mixture	K.Kawahira	• • •	463
168 (ISIJ Research Promotion Grant)Simulation model for crystallization of inclusions during solidification of multi-component steels	K.Ohsasa	• • •	865
169 (ISIJ Research Promotion Grant)Phase-field simulation of development of coarse columnar $\gamma$ grain structure in CC slabs	M.Ohno	• • •	197
170 Modeling the formation of center macrosegregation with inhomogeneous solidification	T.Murao	• • •	866
171 Quantitative analysis of the removal ratio of fine particles by gas bubbling in water model experiment	M.Miyazaki	• • •	867
172 Effect of Cu,Ni and Sn on surface cracks of CC slab	N.Yoshida	• • •	868
173 Effect of Ti content on hot ductility of steel	K.Isobe	• • •	179
174 Effect of high temperature deformation on reduction of prior austenite grain size for improving hot ductility of steel	M.Kang	• • •	869
175 Clarification of hot ductility improvement mechanism by predeformation treatment	Y.Awajjiya	• • •	181
176 Modification of Kozeny-Carman model for permeability of columnar dendritic structures	Y.Natsume	• • •	870
177 Evaluation of modified Kozeny-Carman model for permeability of columnar dendritic structures	D.Takahashi	• • •	871
178 A proposal for macroscopic model of shear deformation in semi-solid state	S.Morita	• • •	872
179 Convection induced by a static magnetic field during solidification of Al-Cu alloys	K.Inoue	• • •	873
180 Comparison of crystallographic orientations determined from solidified pattern and EBSD analysis	H.Esaka	• • •	203
181 Effect of grain structure on macrosegregation	F.Satou	• • •	874
182 Effect of carbon concentration on the as-cast $\gamma$ grain structure in hyper-peritectic carbon steels	S.Tsuchiya	• • •	204
183 Preliminary evaluation of permeability from dendrites obtained by in-situ observation	T.Kondo	• • •	875
184 Observation of peritectic reaction process in Ag-35 mass%Sn alloy	Y.Hattori	• • •	876
185 Liquid phase behavior in centrifugal casting under different rotating velocity	H.Suzuki	• • •	877
186 In-situ observation of model experiment for horizontal centrifugal casting by a high-speed camera	H.Esaka	• • •	878

## Environmental, Energy and Social Engineering

Lecture No. Plenary Session	Title	Speaker	Page
187	Physical adsorption technology for the separation of blast furnace gas	Y.Mogi	• • • 879
188	Heat release of direct-contact type latent heat storage unit for steelworks	T.Nomura	• • • 880
189	Formation behavior of H <sub>2</sub> gas by reaction between FeO-containing slag and water vapor	M.Sato	• • • 881
190	Alkali elution behavior of steelmaking slag into seawater	H.Tamaki	• • • 882
191	Effect of humus soil addition on dissolution behavior of elements from steelmaking slag into seawater	X.Zhang	• • • 883
192	The solidification process analysis of admixture of dredge soil and slag for bring up sea grass bed	N.Ishikawa	• • • 151
193	Material flow analysis of alloying elements for steel	K.Nakajima	• • • 884
194	Substance flow analysis of alloying elements in steel associated with international trade based on WIO-MFA model	H.Ohno	• • • 885
195	Rapid determination of tramp elements in steel scraps using laser-induced plasma spectrometry	S.Kashiwakura	• • • 886
196	Recyclability evaluation of various scrap steels in terms of TMR	E.Yamasue	• • • 887

## Instrumentation, Control and System Engineering

Lecture No. Plenary Session	Title	Speaker	Page
197	Development of shape measurement technique in hot strip finishing mill	T.Kato	• • • 888
198	The development of pig iron and molten slag level meter in BF hearth	T.Ito	• • • 889
199	A development of statistical process control system with analysis subsystem	M.Sugiyama	• • • 890
200	Optimum scheduling system for coal blending	H.Kobayashi	• • • 891
201	Simulation of the coil design for ERW steel pipe	S.Kuyama	• • • 892
202	Development of a training simulator for operations around the mold in continuous caster	H.Kitada	• • • 893

## Processing for Quality Products

Lecture No. Plenary Session	Title	Speaker	Page
203	Effect of material properties of welded steel tube on flaring limit and deformation behavior in flaring test	T.Horiuchi	• • • 894
204	Development of load prediction model by upsetting test and elementary analysis (Development of CAE for plasticity processing system with ultrasonic vibration-1)	T.Yoshida	• • • 285
205	Studies of mechanical factors on properties of cutting (Development of CAE for plasticity processing system with ultrasonic vibration-6)	T.Yoshida	• • • 895
206	Plastic deformation and work hardening during machining in carbon steel	Y.Katayama	• • • 896
207	Analysis of build-up edges information formed during machining in carbon steel	Y.Katayama	• • • 897
208	Effect of carbides tool material on belag formation of Ca-treated steels	K.Watari	• • • 898
209	Effect of friction between tool and workpiece on chip formation mechanism(2 <sup>nd</sup> ) (Analysis of chip separation and built-up edge formation with FEM)	M.Hashimura	• • • 899
210	Effect of baffle plates on splash in wiping simulator	G.Takeda	• • • 900
211	Staggered arrays of free-surface impinging water jets on heat transfer characteristics of hot steel plate	J.Lee	• • • 901
212	Effects of surface roughness on spray cooling characteristics	H.Fukuda	• • • 272
213	Hydrodynamics and boiling phenomena of two droplets impinging on hot solid	S.Yoshimoto	• • • 902
214	The prediction of strip temperature with the analytic model approach in hot strip mill	J.H.Lee	• • • 903
215	Thermal crown prediction of work-rolls in hot strip rolling	Y.Takamachi	• • • 904
216	The effect of inlet angle on strip curvature in single driven rolling (Strip curvature in single driven rolling-2)	D.Kasai	• • • 905
217	Numerical simulation of flatness near the reduction limit by stainless foil	Y.Maeda	• • • 906
218	FEM analysis for skin-pass rolling of thin steel sheet	H.Kijima	• • • 907
219	Characteristics of skinpass rolling for thick strip with dull work roll	T.Siraishi	• • • 908
220	Characteristics of tinplate skinpass rolling using dull work roll	T.Akashi	• • • 909
221	(Invited Lecture)Compaction behavior of iron powder in low pressure region	N.Yodoshi	• • • 910
222	(Invited Lecture)Effect of milling time on strength of TiN-Fe cermet fabricated by dry mechanical milling and short time sintering	H.Nakayama	• • • 911
223	(Invited Lecture)Reliability test of P/M soft magnetic material	S.Egashira	• • • 912
224	(Invited Lecture)Development of composite cutting tool reduced tungsten usage	H.Moriguchi	• • • 913
225	Fatigue strength of sintered and induction heated and quenched compacts made of Mo prealloyed steel powder	S.Unami	• • • 914
226	Microstructural defect appearing at hot isostatic pressing treatment for liquid phase sintering materials	H.Matsubara	• • • 915

227	Microstructural and mechanical properties of pure titanium matrix composites reinforced with nano carbon particles via wet process in powder metallurgy route	K.Kondoh	• • •	916
228	Deposition of Cu porous layer on the ferrous substrate by layer irradiation	H.Miura	• • •	917
229	Viscoelastic evaluation in the magnetic field of the magnetic particle dispersion elastomer	H.Miura	• • •	918
230	Effect of welding parameters on several properties in friction stir welded high nitrogen steel	M.Miyake	• • •	919
231	Interfacial microstructure of friction welded joints of carbon steel and aluminum alloys	T.Shibayanagi	• • •	920
232	(ISIJ Research Promotion Grant)Microstructure control of tool steel by friction stir processing	H.Fujii	• • •	921
233	Degreasing behavior of Ca sulfonate on gold surface observed by SEIRAS	N.Nagase	• • •	417
234	Effect of oxides in high strength weld metal on toughness	S.Nakamura	• • •	280
235	Investigation of three body abrasion test method for edge wear resistance in high carbon steel sheet	T.Narita	• • •	922
236	Effect of microstructure of the guide for tool wear in the stainless steel rolling	T.Katsumura	• • •	923

## Microstructure and Properties of Materials

Lecture No.	Title	Speaker	Page
<b>Plenary Session</b>			
237	Numerical estimation of applicability of Choo and Lee's method for evaluating detrapping activation energy	K.Ebihara	• • • 924
238	Interaction between dislocation and hydrogen and hydrogen embrittlement susceptibility for SUS316L and SUS304 stainless steels	M.Kitamura	• • • 925
239	Hydrogen trapping sites at dislocation, vacancy and grain boundary in $\alpha$ -iron using thermal desorption spectrometer detected from low-temperature	N.Abe	• • • 926
240	Evolution of hydrogen trap site during low cycle fatigue test in spheroidized S45C	G.Suzuki	• • • 927
241	Effect of hydrogen-induced lattice defects on ductility loss of high-strength low-alloy steel	T.Nakamoto	• • • 928
242	Detection of lattice defects associated with hydrogen and hydrogen embrittlement under elastic stress of high-strength steel	T.Doshida	• • • 929
243	Behavior of hydrogen in electrolytically charged SCM435 steel	N.Miyata	• • • 930
244	Electrochemical measurements of diffusion coefficients of hydrogen for various galvanized steels	M.Uchiyama	• • • 931
245	Evaluation of delayed fracture characteristics of high strength steels using CSRT	Y.Miyake	• • • 932
246	Delayed fracture characteristics of automobile high strength steel sheets with plastic strain	N.Wada	• • • 933
247	Delayed fracture characteristics of boron-bearing high strength bolt steel	H.Ishikawa	• • • 934
248	Reduction of delayed fracture susceptibility through surface-softening and high-temperature tempering of high-strength steel	Y.Matsumoto	• • • 935
249	Relation between hydrogen-related crack propagation and substructure in low carbon martensitic steel	A.Shibata	• • • 936
250	Comparison of hydrogen embrittlement susceptibility for pure titanium including different existing states of hydrogen	H.Fukushima	• • • 937
251	Effect of hydrogen on rolling contact fatigue phenomena due to hydrogen embrittlement	T.Kinami	• • • 291
252	Effect of impurity element on the low cycle fatigue strength of hydrogen pre-charged SCM435 steel	C.Kittinan	• • • 938
253	Giga-cycle fatigue properties for Ti-6Al-4V ELI alloy under tensile mean stress	E.Takeuchi	• • • 939
254	Ultrasonic fatigue testing for heat resistance alloys	Y.Furuya	• • • 940
255	Gigacycle fatigue properties of hydrogen charged V-added steel	H.Hirukawa	• • • 941
256	Phase and properties evolution of nano-crystalline SUS316L austenitic stainless steel	H.C.Wang	• • • 942
257	Deformation-induced martensitic transformation in a low-density steel	S.J.Park	• • • 943
258	Effects of nitriding treatment conditions on nitriding rate for PM high speed steel	M.Maeda	• • • 944
259	(ISIJ Research Promotion Grant)Phase stability and phase equilibria concerning laves phase in Fe-Cr-Mo-Si system	H.Ohtani	• • • 945
260	Unusual phase equilibria and phase transformations in Fe-Mn based alloys	K.Ishida	• • • 946
261	Effect of sub-zero treatment on grain size of reverse austenite transformed from martensite in low-carbon low-alloy steel	Y.Ueda	• • • 947
262	Development of new low alloy steel applied to geothermal turbine rotor shaft Part1:Effect of alloying elements on hardenability and toughness	Y.Mito	• • • 948
263	Development of new low alloy steel applied to geothermal turbine rotor shaft Part2:Effect of alloying elements on SCC resistance behaviors	L.Yan	• • • 949
264	Development of new low alloy steel applied to geothermal turbine rotor shaft Part3:Manufacturing and verification of sand mold steel ingot	S.Suzuki	• • • 950
265	Determination factor of low temperature toughness in a quenched and tempered API 5L-X65 grade clad steel	Y.Izumiyama	• • • 951
266	Effect of the inclusion length on the rolling contact fatigue	Y.Neishi	• • • 383
267	Observation of cracks originated from sulfide inclusions during rolling contact fatigue of bearing steels	K.Hashimoto	• • • 952
268	Crack initiation behavior of TiN type inclusions origin in rolling contact fatigue process	T.Udagawa	• • • 953
269	Influence of Si on the spheroidization of cementite in hyper-eutectoid bearing steels	J.S.Lee	• • • 954

270 Effect of magnetic field on aging effect of high carbon steel wire	S.Nishida	• • •	319
271 Effects of transformation temperature and $\gamma$ grain size on grain refinement of pearlite steel	M.Sakamoto	• • •	955
272 Microstructure evolution and thermal stability on sliding surface of pearlite steels	K.Miyata	• • •	956
273 The effect of alloying element on nitrocarburizing behavior in pure iron	T.Chida	• • •	957
274 Fabrication of the hot-dipped Al alloy coated dual phase steels based on CCT and TTT diagrams	N.Takata	• • •	958
275 Influence of silicon oxide on galvannealing reaction of Si containing steel	Y.Makimizu	• • •	959
276 Influence of oxygen content on oxidation behavior of steel	M.Miyata	• • •	960
277 Effect of pre-plating compositions on galvanizing properties in TWIP steel sheet	S.H.Jeon	• • •	344
278 Effect of Cr content on corrosion resistance of Fe <sub>3</sub> Al in HCl aqueous solution	M.Tomaru	• • •	961
279 Corrosion behavior of aluminum-alloy coated 316SS in liquid Pb-Bi	H.Yokota	• • •	962
280 Development of steel plates for paint use in saline environment	T.Kamimura	• • •	352
281 (ISIJ Research Promotion Grant)Influence of shot peening on initial oxidation stage of Cu containing steel	A.Takemura	• • •	963
282 (ISIJ Research Promotion Grant)Cross-sectional observation of shot-peened copper-containing steel during initial oxidation	Y.Tanaka	• • •	964
283 Phase transformation behavior of thermally grown FeO	S.Hayashi	• • •	965
284 Mechanism of surface-strain-based improvement to chemical conversion phosphate coating for pretreatment of painting on high Si-added steel	Y.Ishiguro	• • •	347
285 Development of the texture measurement system using pulse neutron beam	T.Ito	• • •	966
286 Inhomogeneous deformation microstructures in cold rolled ferrite steels	S.Nakanishi	• • •	967
287 Crystallography of ausformed nanobainite	W.Gong	• • •	968
288 High spatial resolution observation of steel by X-ray CT	F.Tomizato	• • •	969
289 A calculation of induction heating considering temperature dependence of magnetization characteristics	H.Takeuchi	• • •	397
290 Molecular dynamics study of the bcc-fcc phase transformation of iron	S.Tateyama	• • •	399
291 Investigation of validity of the model for predicting M <sub>s</sub> temperature for tool steel	S.Fukumoto	• • •	970
292 (ISIJ Research Promotion Grant)Hydrogen trap position in coherent Fe/VC, Fe/V <sub>4</sub> C <sub>3</sub> (baker-nutting) by ab-initio calculation	T.Murai	• • •	971
293 Change in phase transformation mechanism by Mn addition in high nitrogen stainless steel	M.Fukuyama	• • •	972
294 Effect of Nb addition and cooling conditions on precipitation hardening of high V added medium carbon steels	E.Kakiuchi	• • •	331
295 Magnetism of cementite and its precipitation under magnetic field	H.J.Choe	• • •	973
296 On the mechanism of hardening by annealing in SUS304 stainless steel processed by HPT	I.Shuro	• • •	974
297 Atom probe tomography analysis of carbon atoms during recovery in Ti added low carbon cold rolled steel	Y.Kobayashi	• • •	297
298 Influence of microstructure change in hot strip on the recrystallization behavior in cold rolled steel sheets	Y.Yamaguchi	• • •	298
299 Effect of amount of Ti addition on recrystallization behavior in high purity ferritic stainless steel	S.Tada	• • •	975
300 Microstructural evolution during warm deformation of tempered martensite in carbon steels	U.H.Lee	• • •	976
301 Effect of chemical composition of ferritic stainless steels on nickel brazability	T.Mizoguchi	• • •	977
302 Effect of post-weld heat treatment on reliability of duplex stainless steel	R.Udo	• • •	407
303 The nitride precipitation behavior and the material properties of Mo-free duplex stainless steel (The development of lean duplex stainless steel-1)	Y.Oikawa	• • •	978
304 Effect of propagation process on the repassivation potential of crevice corrosion of duplex stainless steels	T.Ehashi	• • •	979
305 (ISIJ Research Promotion Grant)Porosification of stainless steel surfaces by electrochemical treatments in organic solvents	H.Tsuchiya	• • •	980
306 Evaluation of internal fatigue failure of SUJ2 by ultrasonic torsional fatigue test	H.Shimanuki	• • •	981
307 Effect of crack arrester on unstable ductile crack propagation in high-pressure gas pipelines	T.Fujii	• • •	982
308 Effect of punching velocity on hydrogen embrittlement in ultra-low carbon steel with ultra-high density lattice defects	K.Morisako	• • •	983
309 Difference of voids nucleation and growth processes between notchless and notched specimens in tensile test	S.Niigaki	• • •	984
310 The influence of Si content on deformation stress of single crystal pure iron	K.Kimura	• • •	985
311 Effect of grain boundary character and structure on strength in pure aluminum bicrystals	T.Tanaka	• • •	986
312 Measurement of distribution of elastic deformation on crack tip of plane strain condition by meso-hardness testing	N.Nagashima	• • •	987
313 Prediction of bending deformation behavior of strength-gradient steel sheets	K.Tsuboi	• • •	988
314 Pattern of cleavage fracture facets in ferrite steel and their temperature dependence	K.Shibanuma	• • •	989
315 The brittle-to-ductile transition in Fe-Al single crystals	M.Tanaka	• • •	360
316 Examination of simple fretting fatigue test and its examples	T.Yokoi	• • •	990
317 Effect of yield to tensile ratio on brittle failure of ultra-high strength chain	J.Yin	• • •	991



318 Delamination behavior of ultrafine-grained steels processed by warm tempforming	Y.Kimura	• • •	366
319 High total-balance of UFG ferrite/austenite 0.1C-5Mn steel	T.Hanamura	• • •	992
320 Expansion of multilayered steel composites with improved strength-ductility combination	S.Nambu	• • •	993
321 Effects of initial microstructure on toughness after rapid heating and quenching of boron steel sheets	K.Hikita	• • •	994
322 Tensile behavior analysis of dual phase steel in rigid plastic model	S.Nomura	• • •	305
323 Scale-bridging 3D/4D characterization on deformation and fracture behavior in DP steels II -Evaluation of stress partitioning behavior using EBSD-based elastic strain measurement-	M.Ojima	• • •	362
324 Stress partitioning behavior of multilayered steels measured by in situ neutron diffraction during tensile deformation	M.Ojima	• • •	995
325 Development of Fe-30Cr-50Ni-W alloy without $\gamma'$ precipitation strengthening for advanced USC boilers	H.Semba	• • •	334
326 High temperature low-cycle fatigue properties of NW6617(Ni-22Cr-12Co-9Mo) nickel alloy plate	M.Hayakawa	• • •	996
327 Effect of stress-relief treatment on microstructure and mechanical properties in HR6W weld joint	K.Kubushiro	• • •	997
328 Effect of Al and Ti content on mechanical properties and weld ability of Ni-18Cr-13Co-9Mo-0.1Ta -0.3Nb-Al-Ti alloy	S.Miyashita	• • •	998
329 Precipitation and effect on creep strength of $\sigma$ phase in $\gamma'$ strengthened Ni based alloy	S.Oinuma	• • •	999
330 Effect of niobium and titanium on mechanical properties of Ni-0.04C-26Cr-21Co-1Al-1.9Ti-1.8Nb alloy	K.Nemoto	• • •	1000
331 Effect of deformation mode on misorientation change in nickel-base superalloy	R.Takaku	• • •	1001
332 Dislocation substructure at $\gamma/\gamma'$ interface of a Re free single crystal nickel-based superalloy, NKH71, crept at 1273K, 160MPa	Y.Kubo	• • •	1002
333 Creep properties of re free single crystal nickel-based superalloy, NKH74, at 1273K	S.Fukamachi	• • •	1003
334 Hot-stretch-reduced ERW tube with highly-oriented axis of easy magnetization $\langle 001 \rangle$ along circumferential direction	Y.Ishiguro	• • •	1004
335 DC electromagnetic property in hot-stretch-reduced ERW tube with highly-oriented axis of easy magnetization $\langle 001 \rangle$ along circumferential direction	M.Aratani	• • •	1005
336 Magnetic shielding property in hot-stretch-reduced ERW tube with highly-oriented axis of easy magnetization $\langle 001 \rangle$ along circumferential direction	Y.Ishiguro	• • •	1006
337 $\langle 001 \rangle$ Fiber texture formation mechanism in Fe-3%Si achieved by high-temperature uniaxial compression	Y.Onuki	• • •	1007
338 Effect of cold rolling reduction rate on secondary recrystallized orientation in 3% Si-Fe	T.Imamura	• • •	311
339 Onset of secondary recrystallization in high purity 3.3%Si steel	Y.Hayakawa	• • •	1008
340 Application of grain growth simulation to normal grain growth in steel sheets (Investigation of grain growth model-2)	K.Murakami	• • •	310
341 Effect of Al-addition on the fracture behavior transition by strain rate in Si steel	T.Mizuguchi	• • •	1009
342 Thermal conductivity of lamination stacks of non-oriented electrical steel	S.Yamazaki	• • •	316
343 Variant selection of bainite and lath martensite in low carbon steel	N.Takayama	• • •	1010
344 In-situ observation of the development of martensite in steels	N.Shibuta	• • •	1011
345 Martensitic transformation in a micrometer-sized Fe-30.5at.%Ni poly and single crystalline particles	J.M.Nam	• • •	1012
346 Effect of grain size on deformation-induced martensitic transformation behavior in metastable austenitic stainless steel	T.Iwasaki	• • •	1013
347 Deformation-induced martensitic transformation behavior of retained austenite dispersed in martensitic stainless steel	Y.Matsuoka	• • •	326
348 Effect of magnetic field on $\gamma \rightarrow \epsilon' \rightarrow \alpha'$ isothermal martensitic transformation in austenitic stainless steel	J.Choi	• • •	1014
349 Effect of bainite transformation temperature, holding time, and carbon concentration on dislocation density of bainite structure	S.Taniguchi	• • •	1015
350 (ISIJ Research Promotion Grant)Martensitic transformation of BCC phase in Fe-Mn-Al-based alloy and superelasticity	T.Omori	• • •	1016
351 Effect of transformation temperature on isothermally-transformed microstructure of Fe-N binary system austenite	N.Fukuzawa	• • •	1017
352 Formation and low temperature aging process of high nitrogen austenite on the surface of SS400 steel rod	T.Koyano	• • •	1018
353 Effects of nitrogen absorption conditions on microstructure evolution for low-carbon steel	K.Tsukiyama	• • •	1019
354 Effect of alloy elements on hardenability in B-added steels	T.Fujishiro	• • •	327
355 Phase transformation of retained austenite during tempering in high carbon steels	T.Suzuki	• • •	1020
356 Carbon enrichment in untransformed austenite during bainite transformation stasis	N.Takayama	• • •	376
357 Dissolution behavior of grained cementite of eutectoid carbon steel and high carbon-chromium bearing steel in rapid heating	K.Yamamoto	• • •	1021
358 Critical deformation condition for dynamic ferrite transformation in 6Ni-0.1C steel	N.Park	• • •	1022
359 Annealed microstructure of SUS304 metal sleeve	S.Otani	• • •	1023
360 Development of non-magnetic and high yield point SUS304 steel by warm working	S.Torizuka	• • •	409
361 Characteristics of low Ni austenitic stainless steel for spring of SUS301 substitution	T.Hidan	• • •	1024

362 The mechanism behind the improvement of low temperature embrittlement in Ni-free high-nitrogen austenitic steels	C.Furusho	• • •	1025
363 Evaluation of high strength 18Mn18Cr steel made by pressurized ESR	F.Takahashi	• • •	1026
364 Material property and formability of 14Cr-0.1Sn ferritic stainless steel (Development of Sn containing stainless steel-1)	E.Ishimaru	• • •	402
365 Mechanism for suppression of surface hot-shortness in 14Cr-0.1Sn ferritic stainless steel (Development of Sn containing stainless steel-2)	M.Hatano	• • •	403
366 Effect of Sn addition on corrosion behavior of 14Cr-0.1Sn ferritic stainless steel (Development of Sn containing stainless steel-3)	H.Matsuyama	• • •	404
367 Inhomogeneous deformation behavior observed using high-precision markers in ferrite-bainite steels	H.Ikeda	• • •	1027
368 Analysis for inhomogeneous deformation behavior of ferrite-martensite dual-phase steels using high-precision markers	H.Minami	• • •	1028
369 Effects of martensite morphology on the deformation and fracture behavior in Dual-Phase steel	N.Sato	• • •	1029
370 Evaluation of formation and development behaviors of micro-voids in tensile-deformed DP steel	K.S.Park	• • •	1030
371 Effect of heat treatments temperature on mechanical properties in bainitic steel	K.Nomaru	• • •	1031
372 Influence of intergranular bainite on the mechanical property in B/WING steels	Y.Iki	• • •	1032
373 Microstructure observations for tensile-deformed lath martensite in a layer-integrated steel	T.Hayashi	• • •	381
374 (ISIJ Research Promotion Grant)Comparison between TRIP and TWIP in high-Mn austenitic steel with fine grained microstructure	R.Ueji	• • •	1033
375 Appearance of yield point phenomenon in Ni bearing IF steel	D.Akama	• • •	1034
376 Influence of chromium on the Hall-Petch coefficient in ferritic stainless steel	A.Hironaka	• • •	408
377 The change in dislocation mobility with Ni content in ferritic steels and its effect on the brittle-to-ductile transition	K.Maeno	• • •	359
378 Effect of solute Ni on mechanical property of ferritic steel	N.Yoshimura	• • •	358
379 Tensile behavior of V-added low carbon steel with interphase boundary precipitated structure	K.Sato	• • •	1035
380 Internal friction of aluminum matrix composites containing ultra-fine grained Fe-16Cr alloy particles	M.Tanaka	• • •	1036
381 Precipitation and hardening behavior of Cu in BCC-,FCC- and dual phase stainless steel	H.Kimura	• • •	329
382 (ISIJ Research Promotion Grant)Influence of the pre-strain direction on the strain age-hardening	T.Suzuki	• • •	1037
383 Relation between creep curve and degradation of 9Cr-W steel	M.Tamura	• • •	341
384 Influence of transient creep on acceleration creep of Mod.9Cr-1Mo steel	F.Abe	• • •	340
385 Study on heat-to-heat variation of creep strength of modified 9Cr-1Mo steel	K.Kimura	• • •	1038
386 Influence of the 2011 off the pacific coast of Tohoku earthquake on creep test data	H.Miyazaki	• • •	1039
387 Microstructural assessment at creep cavities for the weld joints of high Cr heat resistant steels	Y.Tanaka	• • •	1040
388 Creep property of A <sub>23</sub> HAZ simulated high Cr ferritic heat resistant steels	Y.Liu	• • •	339
389 Static recovery during long-term creep and its contribution to the breakdown of creep strength in Mod.9Cr-1Mo steel	R.Chen	• • •	1041
390 (ISIJ Research Promotion Grant)Interdiffusion in Fe-Cr-X ternary alloys as the fundamental system of ferritic heat-resistant steels	Y.Murata	• • •	1042
391 Effect of Ni addition on high temperature (923-1023K) creep strength of precipitation-strengthened 15Cr ferritic steels	M.Shibuya	• • •	1043
392 Creep strength and microstructure of precipitation strengthened 15Cr ferritic steel at higher temperature than 973 K	Y.Toda	• • •	1044
393 Effect of grain size on steam oxidation for shot-peened 18Cr-8Ni steels	Y.Nishiyama	• • •	333
394 Phase equilibria among $\gamma$ -Fe/TCP/GCP and its change with temperature in Fe-Ni-Nb-Mo quaternary system	K.Suzuki	• • •	1045
395 Mechanical properties of Fe-20Cr-30Ni-2Nb steel at room temperature	N.Kanno	• • •	1046
396 The effect of microelements addition on creep properties of Fe-20Cr-30Ni-2Nb austenitic heat resistant steel	Y.Misosaku	• • •	1047
397 The role of grain boundary Fe <sub>2</sub> Nb laves phase in creep acceleration stage of Fe-20Cr-30Ni-2Nb austenitic heat resistant steel	I.Tarigan	• • •	1048
398 Microstructure and formability of an ultra high-strength TRIP-aided martensitic sheet steel -1 <sup>st</sup> report:Effect of partitioning process on formability-	J.Kobayashi	• • •	1049
399 Microstructure and formability of ultra high-strength TRIP-aided martensitic sheet steels -2 <sup>nd</sup> report: Effects of Cr, Mo and Ni on formability-	D.V.Pham	• • •	1050
400 Effect of Nb addition on tensile properties of high-Mn multiphase steels	C.S.Oh	• • •	387
401 Decomposition behavior of retained austenite during heating of the TRIP steel by in situ neutron diffraction	Y.Arakaki	• • •	1051
402 Effects of microstructure on stretch-flange-formability of Dual-Phase type cold-rolled steel sheets	K.Takashima	• • •	1052
403 Effect of micro structure on voids nucleation behavior and ductile fracture in ferrite-martensite DP steels (Fundamental investigations to clarify the mechanism governing local ductility-5)	D.Maeda	• • •	1053

404 Mechanism analysis of micro voids nucleation in ferrite–mertensite dual phase steel by FEM (Fundamental investigations to clarify the mechanism governing local ductility–6)	T.Matsuno	• • •	1054
405 Change of the work hardening of hot–rolled ferritic steel in the precipitation of fine carbide	N.Kosaka	• • •	1055
406 Influence of residual stress on fatigue strength of sheared edge	T.Shiozaki	• • •	1056
407 Numerical simulation of $\gamma \rightarrow \alpha$ transformation in consideration of the variant selection rules(1)	Y.Suwa	• • •	386
408 Theoretical analysis of the effect of cementite geometry on its dissolution behavior during austenitization in low–carbon steels	T.Nishibata	• • •	384
409 Simulation of alpha grain growth in Ti–rich Ti–Fe–O alloy using phase–field method	A.Seki	• • •	421
410 Surface modification by rapid heating and quenching for $\alpha$ –titanium alloys	M.Fushimi	• • •	1057
411 Influence of random grain–orientation distribution on low temperature fatigue strength for near $\alpha$ –titanium alloy	T.Yuasa	• • •	1058
412 Effect of heat treatment conditions on strength–ductility relationship in Ti–5%Al–1%Fe hot rolled sheets	A.Kawakami	• • •	1059
413 Influence of strain and initial microstructure on globularization of alpha phase in Ti–6Al–4V alloy	Y.Ito	• • •	1060
414 Alloying behavior of Ni <sub>3</sub> (Si,Ti) intermetallic alloy by Ta addition	D.Imajo	• • •	1061
415 High–cycle fatigue property of $\beta$ –type Ti–6.8Mo–4.5Fe–1.5Al alloy containing small amount of B	T.Eto	• • •	1062
416 Improvement of mechanical properties of $\beta$ –type titanium alloy by dispersing ceramics particles	J.Hieda	• • •	1063
417 Reduction mechanism of solid TiO <sub>2</sub> by molten Mg	K.Ouchi	• • •	1064

## Process Evaluation and Material Characterization

Lecture No.	Title	Speaker	Page
<b>Plenary Session</b>			
418 Surface analysis of Japanese sword with nugui treatment		K.Katamata	• • • 1065
419 Surface nitriding treatment of Fe–Cr alloys by using microwave induced nitrogen plasma at atmospheric pressure		S.Sato	• • • 1066
420 Measurement of lattice strain in a superelastic Cu–Al–Mn alloy under loading by using white X–ray micro–beam		E.P.Kwon	• • • 1067
421 Chemical reaction of ethyleneglycol according to dissolution of calcium oxide		N.Uehara	• • • 1068
422 Ionic liquid–based extraction for the determination of trace heavy metals in iron and steel		T.Kato	• • • 1069
423 Thermo–responsive polymer–mediated extraction for the separation and determination of trace metals in high purity iron		K.Sakurai	• • • 1070
424 Development of analytical method for fluorine in blast–furnace slag with flow injection analysis(FIA) after pyrolysis		Y.Noguchi	• • • 1071
425 (ISIJ Research Promotion Grant)Development of two–dimensional on–line redox derivatization liquid chromatography and its application to determination of trace amount of cobalt in steel samples		M.Shibukawa	• • • 1072
426 Calibration curves for Ni determination in Fe–Ni alloys by laser–induced plasma emission spectrometry		C.Abe	• • • 414

## Environmental, Energy and Social Engineering

Lecture No.	Title	Speaker	Page
<b>Discussion Sessions</b>			
<b>Production of green energy and the use for ironmaking and steelmaking</b>			
D1	Production of hydrogen and oxygen by intermediate temperature steam electrolysis for recovery of heat energy	T.Ishihara	• • • 554
D2	Investigation of the hydrogen steelmaking processes using high temperature gas-cooled reactors	M.Ogawa	• • • 556
D3	Effect of H <sub>2</sub> component in reducing gas on the reduction disintegration of sinter	E.Kasai	• • • 560
D4	Utilization of hydrogen for carbon recycling iron making system	Y.Kato	• • • 564
D5	Evaluation of high purity iron obtained by hydrogen reduction	Y.Kashiwaya	• • • 568
D6	Process system for iron ore reduction with ammonia	S.Hosokai	• • • 572
D7	Discussion on the slag foaming control by the steam injection	K.Ito	• • • 574
D8	Physical chemistry of hydrogen production process by using converter-steam reaction	H.Matsuura	• • • 577
D9	Phosphorous distribution ratio between solid iron and molten slag in hydrogen direct steelmaking	N.Maruoka	• • • 580
D10	Numerical analysis on blast furnace operation with hydrogen injection	H.Nogami	• • • 584
D11	Reduction rate enhancement of carbon composite pellets by using semi-charcoal	T.Usui	• • • 588
D12	In situ observation of high temperature properties of iron ore during sintering process	Y.D.Pei	• • • 592

## Instrumentation, Control and System Engineering

Lecture No.	Title	Speaker	Page
<b>Discussion Sessions</b>			
<b>Process control achieving sustainable and fault-tolerant production</b>			
D13	Reduction in coke oven heat consumption by improving of combustion control	K.Tsuda	• • • 596
D14	Time-space multi-resolution analysis on the dynamics of blast furnaces	K.Tsumura	• • • 600
D15	Static control in BOF with the operating cost optimization function	K.Iwamura	• • • 604
D16	Synthesis of feedforward tracking control input to satisfy constraints of maximum power consumption	T.Asai	• • • 606
D17	Prediction of photovoltaic generation and confidence evaluation	N.Murata	• • • 610
<b>Modeling and control to realize the deviation-free production</b>			
D18	Stability of temperature control of coke oven batteries	K.Tsumura	• • • 17
D19	Shape control in reverse plate rolling mill	Y.Hashimoto	• • • 614
D20	Variance suppression for gauge control via stochastic optimal control	K.Fujimoto	• • • 21
D21	Nonlinear receding horizon control of probability density functions and investigation of its applicability to steel making processes	T.Ohtsuka	• • • 25
D22	Model development for estimating molten steel temperature in ladle and tundish	T.Okura	• • • 29
D23	Prediction and control of probability distribution of liquid steel temperature by bootstrap filter	S.Sonoda	• • • 33
<b>Advanced system integration for preserving, sharing and improving work quality in steel plants</b>			
D24	2-DOF robot operation reflecting human intension	M.Konishi	• • • 618
D25	Development of a support system for manufacturing process design of steel plates	T.Shirasaka	• • • 622
D26	Knowledge acquisition by using machine learning for production planning learning support system in steel production systems	I.Hatono	• • • 626
D27	An agent-based approach for decision-support in production scheduling	H.Tamaki	• • • 630
D28	Advanced system integration for preserving, sharing and improving work quality in steel plants	T.Sawaragi	• • • 634

## Processing for Quality Products

Lecture No.	Title	Speaker	Page
<b>Discussion Sessions</b>			
<b>Cooling technologies for the controlling of microstructure and mechanical properties</b>			
D29	Cooling technology in steel making process	Y.Serizawa	• • • 638
D30	Temperature control of steel products in hot rolling process	N.Nakata	• • • 642
D31	Effects of factors on heat transfer characteristics of spray cooling	R.Miyakoshi	• • • 646
D32	Numerical simulation of transient heat transfer process during localized liquid-solid contacts on a high temperature plate	N.Nagai	• • • 647
D33	A test bench to evaluate transient cooling heat transfer on ROT	Y.Mitsutake	• • • 651

# Program of the 162<sup>nd</sup> ISIJ Meeting (September 20-22, 2011)

D34 Run-out table cooling control using fountain pyrometers in a hot strip mill	S.Nakagawa	• • •	655
D35 Coiling temperature control technology at run-out table in hot strip mill	T.Tsukuda	• • •	659

## State-of-the-art technology and challenges for new corrosion resistant steel tubes & pipes and its manufacturing process

D36 Material design and application limits for low alloy steel sour resistant OCTG	T.Omura	• • •	663
D37 Martensitic stainless steel pipes for oil and gas production and the manufacturing matter	Y.Miyata	• • •	667
D38 Hydrogen entry and hydrogen induced cracking in sour gas environments	M.Sawamura	• • •	671
D39 Stress corrosion cracking on the external surface of high grade linepipe steels	M.Okatsu	• • •	675
D40 Stainless steel boiler tubes for fossil-fired steam cycles	N.Otsuka	• • •	679

## Approach for the elucidation of metallurgy and effect in processing of an oxide scale

D41 Fabrication of a small test descaler and some results	S.Taniguchi	• • •	37
D42 Descaling characteristics of primary scale under hot rolling conditions	S.Ueoka	• • •	41
D43 Experimental analysis of exfoliating stress between metal and scale at high temperature	H.Kushida	• • •	45
D44 A discussion on roll force and scale behavior in hot steel rolling	K.Hara	• • •	69
D45 Growth process of blistering during high temperature oxidation	Y.Kondo	• • •	682
D46 Observation of 3-dimensional morphology of the subscale formed in steels by an organic solvent system dissolution technique	K.Kusabiraki	• • •	65
D47 (Invited Lecture)Mechanical properties of sintered iron oxides	M.Nanko	• • •	61
D48 Evaluation of deformation behavior of oxide scale in hot rolling using vacuum rolling mill	A.Segawa	• • •	73
D49 Transformation behavior of wustite	H.Tanei	• • •	77
D50 Prevention of red scale formation during hot rolling of steels	H.Okada	• • •	81

## Microstructure and Properties of Materials

Lecture No.	Title	Speaker	Page
<b>Discussion Sessions</b>			
<b>Evaluation and application of retained austenite in steel</b>			
D51 Large ductility of high-Mn austenite and the application as a component phase in multi phase steel		R.Ueji	• • • 686
D52 (ISIJ Research Promotion Grant)Effect of carbon and nitrogen on work hardening and deformation structure in austenitic steels		M.Yoshitake	• • • 689
D53 Identical area observations of deformation induced martensitic transformation in SUS304 austenitic stainless steel		M.C.Chen	• • • 691
D54 Stability of retained austenite in low alloy TRIP-assisted steel sheets and its effect on work-hardening behaviour		H.Matsuda	• • • 695
D55 Effects of Al-Nb-Mo addition on impact properties of ultra high strength TRIP-aided bainitic ferrite steels		T.Hojo	• • • 699
D56 A state of quantum beam analysis on stress measurement for TRIP type steel sheet		S.Morooka	• • • 703
D57 Fundamentals and application of quenching and partitioning treatment in martensitic stainless steel -Improvement of its mechanical properties by retained austenite-		T.Tsuchiyama	• • • 707
D58 Role of Si in quenching and partitioning treatment of martensitic stainless steel		J.Tobata	• • • 711
D59 (ISIJ Research Promotion Grant)Morphology and carbon concentration of retained austenite films in low carbon lath martensite		S.Morito	• • • 714

## Microstructure and Properties of Materials&Processing for Quality Products

Lecture No.	Title	Speaker	Page
<b>Discussion Sessions</b>			
<b>Recent developments and perspective of analysis techniques for evaluating microstructures and properties</b>			
D60 Effect of carbon content on three dimensional morphologies of lath martensite in low alloy steels		S.Morito	• • • 718
D61 Quantitative analysis of variant selection in ausformed lath martensite		G.Miyamoto	• • • 720
D62 Nanostructure formed by precipitation of alloy carbides/nitrides in low-alloy steels		T.Furuhara	• • • 724
D63 Influence of solute drag on the growth of Widmanstatten ferrite plates in Fe-C-Mn alloys		R.Weil	• • • 728
D64 Drawability prediction method using continuous texture evolution model		T.Morimoto	• • • 729
D65 A fusion study of 3D metallography and hybrid strain measurement on deformation and fracture		Y.Adachi	• • • 733
D66 Dislocation motion and mechanical properties using phase-field method		H.Kaido	• • • 734
D67 Phase-field simulation on the formation of sub-block structure in lath-martensitic steel		Y.Tsukada	• • • 738
D68 Prediction of ferrite phase formation by using multi-phase-field method and crystal plasticity finite element method		A.Yamanaka	• • • 742



International Organized Sessions  
Environmental, Energy and Social Engineering  
2011/09/22 Lecture Room 7

Ancient and pre-modern production of iron and non-ferrous metals

- 08:45 ~ 08:55  
Opening remarks Prof.E.Izawa(Kyushu Univ.)
- 08:55 ~ 09:55 Chairperson:T.Nakanishi(Kyushu Univ.) and J.Mei(Univ. of Science and Tech. Beijing)
- 08:55 ~ 09:25  
Int. 1 Various pseudo-speisses (*shirome*) produced from smelting of copper ores and lead ores in pre-modern ... 1073  
Japan  
Kyushu Univ. ○E.Izawa
- 09:25 ~ 09:55  
Int. 2 (Invited Lecture)Early metal production—more than just metals ... 1077  
Slags,matte,speiss,and other by-products  
UCL-Q ○T.Rehren
- 10:10 ~ 11:40 Chairperson:E.Izawa(Kyushu Univ.) and T.Rehren(UCL-Q)
- 10:10 ~ 10:40  
Int. 3 (Invited Lecture)Recent research on early copper and bronze discoveries in northwest China ... 1079  
Univ. of Science and Tech. Beijing ○J.Mei
- 10:40 ~ 11:10  
Int. 4 Evolution of silver-smelting technology of Japan in the middle of the 16th century ... 1083  
Kyushu Univ. ○T.Nakanishi·E.Izawa
- 11:10 ~ 11:40  
Int. 5 Acceptance of hi-tin bronze technologies in ancient Japan ... 1087  
Archaeological Inst. of Kashihara ○Y.Shimizu
- 12:35 ~ 14:35 Chairperson:M.Tanaka(Tokyo Univ. of the Arts) and J.-S.Park(Hong-Ik Univ.)
- 12:35 ~ 13:05  
Int. 6 (Invited Lecture)Crucible steel from India:A major metallurgical accomplishment in antiquity ... 1090  
National Inst. of advanced studies ○S.Ranganathan·S.Srinivasan, Univ.of Exeter G.Juleff
- 13:05 ~ 13:35  
Int. 7 On steelmaking and smithery in southwestern Ethiopia, *Dime* ... 1094  
Kyoto Univ. ○E.Yamasue, NHK I.Murahashi
- 13:35 ~ 14:05  
Int. 8 (Invited Lecture)Technological aspects of iron and steel making in ancient Korea ... 1098  
Hong-Ik Univ. ○J.-S.Park
- 14:05 ~ 14:35  
Int. 9 The acceptance and development of iron artifacts in Xinjiang,China ... 1102  
Waseda Univ. ○Y.Tanaka
- 14:50 ~ 17:00 Chairperson:E.Yamasue(Kyoto Univ.) and S.Ranganathan(National Inst. of Advanced Studies)
- 14:50 ~ 15:20  
Int. 10 Chemical affinity analysis of  $\underline{C}+\underline{O}=\underline{CO}$  reaction during “Zuku” production in modified Tatara steelmaking ... 1105  
furnace  
Nippon Inst. of Tech. ○J.Tanabe
- 15:20 ~ 15:50  
Int. 11 Metallurgical microstructure of Japanese matchlock gun fabricated by the Kunitomo manufacturer in ... 1106  
the Edo period  
Tokyo Univ. of the Arts ○M.Tanaka·M.Kitada
- 15:50 ~ 16:20  
Int. 12 Microstructure and nonmetallic inclusions of iron sheets used for Japanese armature gauntlets in the ... 1109  
Edo period  
Tokyo Univ. of the Arts ○N.Kugiya·M.Kitada·F.Kirino

16:20 ~ 16:50

Int. 13 White sparks "Wakibana" in flame as a sign of welding of Tatar steel

... 1113

Tokyo Univ. of the Arts OK.Nagata·N.Kugiya, Tokyo Inst. of Tech. T.Watanabe

16:50 ~ 17:00

Concluding remarks Prof.K.Nagata(Tokyo Univ. of the Arts)



International Organized Sessions  
 Process Evaluation and Material Characterization  
 2011/09/21 Lecture Room 18  
 Neutron: as a tool for developing miracle steel1

- 09:00 ~ 09:05  
 Opening remarks Prof.Y.Tomota(Ibaraki Univ.)
- 09:05 ~ 10:30 Chairperson:M.Sugiyama
- 09:05 ~ 09:50  
 Int. 14 (Invited Lecture) In-situ Neutron diffraction studies of various metals on Engin-X at ISIS ... 539  
 ISIS O.A.M.Paradowska, AGH Univ. of Science and Tech. A.Baczmanski, ISIS S.Y.Zhang, The Open Univ. A. Rao · P.J.Bouchard, ISIS J.Kelleher
- 09:50 ~ 10:10  
 Int. 15 Texture evolution of ferrite steel during anisotropic tensile deformation studied by neutron diffraction ... 1117  
 JAEA O.P.G.Xu, Ibaraki Univ. T.Suzuki · K.Yamanaka, JAEA K.Akita
- 10:10 ~ 10:30  
 Int. 16 Neutron diffraction study on deformation behavior of high-nitrogen duplex stainless steel ... 1119  
 KIMS O.T.H.Lee · H.Y.Ha · B.Hwang · S.J.Kim, KAERI W.Woo, KIMS E.Shin
- 10:40 ~ 12:10 Chairperson:T.Nakayama
- 10:40 ~ 11:15  
 Int. 17 (Keynote Lecture) High temperature deformation by neutron diffraction ... 1121  
 JAEA O.S.Harjo, CROSS T.Ito, Ibaraki Univ. W.Gong, JAEA H.Suzuki · K.Aizawa
- 11:15 ~ 11:35  
 Int. 18 In situ stress measurement by neutron diffraction during tension ... 543  
 -Compression deformation (Bauschinger effect) in nodular graphite cast iron  
 Ibaraki Univ. O.D.Naito · Y.Tomota, JAEA S.Harjo, Hitachi Construction Machinery S.Kubota
- 11:35 ~ 12:10  
 Int. 19 "Laboratory neutron source", a new horizon for steel research ... 1123  
 Hokkaido Univ. O.M.Furusaka
- 13:10 ~ 15:10 Chairperson:A.Taniyama
- 13:10 ~ 13:55  
 Int. 20 (Invited Lecture) Microscopic insights of the unusual thermal stability of nanostructured steel from in-situ neutron scattering experiments ... 1124  
 Oak Ridge National Lab. O.X.-L.Wang · M.K.Miller, Oak Ridge National Lab./Hong Kong Polytechnic Univ. C.T. Liu, HZB U.Keiderling, Oak Ridge National Lab. A.D.Stoica · D.Ma
- 13:55 ~ 14:15  
 Int. 21 Nano-bainite transformation and tempering behaviors studied by *in situ* neutron diffraction ... 1125  
 Ibaraki Univ./JAEA O.W.Gong, JAEA S.Harjo, POSCO M.S.Koo, Ibaraki Univ. H.Nishijima, JAEA K.Aizawa, Ibaraki Univ. Y.Tomota
- 14:15 ~ 14:50  
 Int. 22 (Keynote Lecture) Development of the smaller-angle neutron scattering instrument TAIKAN of J-PARC ... 1128  
 CROSS O.J.Suzuki
- 14:50 ~ 15:10  
 Int. 23 Analysis of hydrogen and deuterium trapping site using artificially produced Fe/TiN multilayers ... 1129  
 Kobelco Research Inst. O.T.Wakabayashi · K.Sasakawa, Kobe Steel T.Nakayama, JAEA M.Takeda · D. Yamazaki, CROSS J.Suzuki
- 15:20 ~ 17:10 Chairperson:K.Sato
- 15:20 ~ 16:05  
 Int. 24 (Invited Lecture) SANS study of precipitation behaviors and chemical compositions in low carbon steel ... 1130  
 KAERI O.B.S.Seong · E.Shin · Y.S.Han · C.Woo · K.H.Lee

16:05 ~ 16:25

Int. 25 Quantitative analysis of nano-size carbide precipitated in steels using small-angle X-ray and neutron scattering methods ... 552

NIMS O.Y.Oba·M.Ohnuma, Kobe Steel E.Kakiuchi·T.Murakami·H.Hatano, JAEA J.Suzuki

16:25 ~ 16:45

Int. 26 Real time neutron small-angle scattering during cementite spheroidization ... 534

Ibaraki Univ. O.Y.H.Su·Y.Tomota, CROSS J.Suzuki, NIMS M.Ohnuma, Yokohama National Univ. S.Morooka

16:45 ~ 17:05

Int. 27 Wetting process of  $\beta$ -FeOOH with Ti by small-angle neutron and X-ray scattering ... 1133

NIMS O.M.Ohnuma·Y.Oba, Kobelco Research Inst. T.Wakabayashi·K.Sasakawa, Kobe Steel T.Nakayama, Kobe Shinwa Womens Univ. T.Ishikawa

17:05 ~ 17:10

Closing remarks