

High Temperature Processes

Lecture No. Plenary Session	Title	Speaker	Page
1	Kinetics of reduction step of wustite to iron of hematite and quaternary calcium ferrite mixtures	D.Noguchi	• • • 871
2	Influence of melt formation behavior and a penetrated pore on reducibility of artificial iron ore agglomerates	H.Kawabata	• • • 872
3	Influence of FeO-SiO ₂ -(CaO,Al ₂ O ₃) slag on gaseous reduction behavior of wustite compact	K.Tanizawa	• • • 873
4	Reduction behavior of the simulated sintered ore by hydrogen mixed gas	A.Yoshida	• • • 874
5	Effect of H ₂ -H ₂ O component in reducing gas on the reduction disintegration of sinter	Y.Kamiya	• • • 875
6	Influence of hydrogen on reaction behavior of sinter under a blast furnace simulated condition- II	H.Mizoguchi	• • • 876
7	Influence of mixing ferro coke on blast furnace simulated reaction behavior in a packed mixed bed	Y.Tanaka	• • • 877
8	Influence of mixing coal composite iron ore hot briquette on blast furnace simulated reaction behavior in a packed mixed bed- III	H.Suzuki	• • • 878
9	Influence of injecting reformed-COG into blast furnace on diffusion behavior of gas	S.Matsuzaki	• • • 879
10	Numerical analysis about penetration behavior of gas injecting at shaft of blast furnace	Y.Ujisawa	• • • 880
11	Dynamic behavior of gas-solid flow at shaft gas injection in blast furnace by DEM-CFD	S.Natsui	• • • 881
12	(ISIJ Research Promotion Grant)Fixation of carbon dioxide using mechanically-milled iron oxide or steelmaking slag	E.Yamasue	• • • 882
13	Sorption and desorption mechanism of CO ₂ on Li ₂ O-SiO ₂ compound	K.Sasaki	• • • 883
14	Dependence of ash contents and crystallization of base materials on smelting in the condition of heating rapidly (Study of new reduction and smelting process-4)	N.Ishiwata	• • • 884
15	Plastic injection for smelting reduction furnace with coke packed bed	T.Matsui	• • • 885
16	Continuous pig iron making by microwave heating(II) (Continuous pig iron making system constructed in 20kW microwave furnace)	K.Hara	• • • 886
17	Reline of Gwangyang No.3 blast furnace	S.H.Lee	• • • 887
18	Statistical diagnosis system in a blast furnace process	Tae Hwa Choi	• • • 888
19	Diagnosis of deadman state in BF operation	J.K.Chung	• • • 889
20	Degradation and cracking of permanent bricks of steel ladles (Long term destruction of refractories-1-)	K.Goto	• • • 890
21	Degradation and cracking of permanent bricks of steel ladles (Long term destruction of refractories-2-)	X.D.Li	• • • 891
22	The behavior of dynamic fatigue fracture of MgO-C bricks	Y.Hino	• • • 892
23	Method of decrease the amount of residual steel in the ladles at Kakogawa works	T.Yoshimoto	• • • 893
24	Development of flangeless type snorkel for RH treatment	T.Kabayashi	• • • 894
25	Improvement of shotcast material for torpedo car	Y.Yamada	• • • 895
26	Corrosion behaviors of zirconia refractory by ilmenite, feldspar and calcium aluminate synthetic fluxes	Min Oh Suk	• • • 896
27	Fe,Mn and P distribution between liquid Fe-Mn sulfide and oxide	S.J.Kim	• • • 897
28	Recovery of high purity rare earth oxide from sludge of Nd-Fe-B magnets	K.Kubo	• • • 898
29	Oxidation removal of Sn from carbon saturated iron via Ag phase	Y.Tanaka	• • • 899
30	Comparison with reaction models in combustion simulation	G.Okuyama	• • • 900
31	Fundamental study on phosphorus separation and collection from steelmaking slag	A.Matsui	• • • 901
32	Application of electric arc furnace oxidizing slag by stainless steel making process to slag aggregate for concrete	T.Tanida	• • • 902
33	Immobilization of harmful elements in electric furnace slag	R.Inoue	• • • 903
34	Technology development for stabilization of high-speed continuous slab casting	T.Hayashi	• • • 904
35	Improvement of castability and surface quality of high-Al content steel slab	T.Miyake	• • • 905
36	Surface quality improvement of leaded free-cutting steel (Surface quality improvement of free-cutting steel-1)	H.Hatakeda	• • • 906
37	Prevention of blow-hole on bloom surface of semi-killed free-cutting steel (Surface quality improvement of free-cutting steel-2)	Y.Tsukaguchi	• • • 907
38	Improvement of steel sheet quality by applying electric field SEN (Development of SEN anti-clogging technology by electrochemistry -5)	Y.Sato	• • • 908
39	Development of technologies for improvement of internal defects of cast blooms of Ti bearing low carbon steel	K.Isobe	• • • 909
40	Assessment of hot ductility of low carbon steel with various strain rates in an air atmosphere	T.E.Park	• • • 910
41	Analysis on the effects of FC mold in slab caster for hot rolled coils quality	Jingxin Song	• • • 911
42	Cluster phenomena for enhancing cleanness of molten steel and transition to supersaturated structure	T.Takahashi	• • • 912
43	Effect of sulfur concentration on inclusion entrapment in solidified shell	H.Ohno	• • • 913
44	Evaluation of the effects of the non metallic inclusion distribution on the local ductility (Fundamental investigations to clarify the mechanism governing local ductility-5)	K.Yamamoto	• • • 914
45	Numerical simulation of inclusion behavior in a tundish during ladle change	K.Takahashi	• • • 915
46	Increasing in the equaxed crystal ratio of high carbon steel with primary γ -Fe phase by inoculation	T.Morohoshi	• • • 916
47	Effect of roughness of the mold surface upon initial solidification structure	K.Tsuchida	• • • 917

48 Estimations of stress distribution in dendrite due to gravity force by phase-field and finite element methods	H.Kashima	• • •	918
49 Evaluation of macrosegregation in small ingot	F.Satou	• • •	919
50 Complex deoxidation of Al-Ti in liquid iron at 1873K	Jong-Oh Jo	• • •	920
51 Effect of aluminum alloying on the formation behavior of inclusions in high Mn steel melts	Joo Hyun Park	• • •	921
52 Measurement of the thermodynamic properties of niobium carbonitride	A.Sakakibara	• • •	922
53 (ISIJ Research Promotion Grant)Oxygen potential on the scale surface in early stage of high temperature oxidation of metal	K.Kawamura	• • •	923
54 Distribution equilibrium of sulfur between CaO-Al ₂ O ₃ -MnO slag and carbon saturated iron	H.Fukaya	• • •	924
55 Equilibrium of Al deoxidation in liquid Fe-Cr alloy	Y.Ogasawara	• • •	925
56 The in-situ TEM observation of the reaction between hematite and graphite	N.Ishikawa	• • •	926
57 Cavity formed by water entry of a superhydrophobic circular cylinder	Y.Ueda	• • •	927
58 Dynamic behavior of a droplet on an inclined hydrophobic plate	Y.Sakai	• • •	928
59 Basic characteristics of swirl motion of a bubbling jet in a bath with an immersion cylinder	T.Fujikawa	• • •	929
60 Observation of the penetration of a particle into a liquid bath	K.Nishiya	• • •	930
61 Simulation of a particle penetration into molten iron by using the SPH solver	A.Ito	• • •	931
62 Effects of ultrasound on dissolution of copper into molten tin	N.Fukuda	• • •	932
63 Removal of dispersed particles from liquid under ultrasound irradiation	Siqinbatu Hao	• • •	933
64 Evaluation of centrifugal water cut of fine iron ores	Y.Fujioka	• • •	934
65 Development of pisolite ore reforming process with BFG	H.Yabe	• • •	935
66 Relationship between-0.25mm ratio in dried pseudo-particle and sintering rate for sintering process	M.Hara	• • •	936
67 Influence of coke breeze distribution in the particle on the quasi-particle and sinter strength	T.Higuchi	• • •	937
68 Effect of carbon material kind on the yield for iron ore sintering	T.Kawaguchi	• • •	938
69 Determination of rolling friction coefficient for sintering mixture in DEM	T.Abe	• • •	939
70 Effect of vertical slits formation in the bed on iron ore agglomeration in sintering process	S.Machida	• • •	940
71 Clarification of granule structure change with index on saturation of moisture (Study on granulation mechanism of raw materials-5)	S.Kawachi	• • •	941
72 Improvement of heat recovery system of cooler waste gas at Kokura No.3 sintering plant	T.Fuji	• • •	942
73 Production of super low slag sinter at NSC Oita No.2DL	T.Murakami	• • •	943
74 Effect of gaseous fuel injection on the pressure drop in sintering bed (Development of secondary-fuel injection technology for energy reduction-4)	Y.Iwami	• • •	944
75 Improvement of the exhaust gas recirculation system and the operational result at Kakogawa No.1 sinter plant	K.Osuga	• • •	945
76 The modification of Kimitsu No.3DL sinter plant	Y.Kawasaki	• • •	946
77 The modification of Nagoya No.1,2DL sinter plant	Y.Nakayama	• • •	947
78 Comparison on different desulfurizers of desulfurization experiments	R.Xiaodong	• • •	948
79 Effect of slag composition on the dissolution rate of converter slag	N.Sasaki	• • •	949
80 Hot metal dephosphorization with CaO-Al ₂ O ₃ -Fe ₂ O ₃ mixed powder top blowing	M.Miyata	• • •	950
81 Phase relationship of CaO-SiO ₂ -FeO-P ₂ O ₅ -Al ₂ O ₃ system for dephosphorization by multi phase flux	X.Gao	• • •	951
82 Influence of vanadium on the kinetic of hot metal dephosphorization	F.Pahlevani	• • •	952
83 Development and application of high efficient blowing technology in large converter	X.Jiang	• • •	953
84 CFD simulations of post combustion behavior in BOF	A.Kaizawa	• • •	954
85 Improvement of productivity in refining process at Oita steelmaking plant	K.Morita	• • •	955
86 (ISIJ Research Promotion Grant)Composition of inclusions in Fe-Al-Ti melt at 1873K	H.Matsuura	• • •	956
87 Nitrogen solubility of Fe-Cr-Ni-Mo system austenitic stainless steels	H.Todoroki	• • •	957
88 Prediction of slag-metal reaction temperature in a laboratory-scale ESR	S.Yamamoto	• • •	958
89 Renewal of a guide car for coke oven and arrangement of operation	T.Fujita	• • •	959
90 Thermal stress analysis of coke oven brick during repairing	K.Yamaoka	• • •	960
91 Repair of central region in coking chamber	N.Ootaka	• • •	961
92 A blockade preventive countermeasure of desulfurizing tower	M.Taniguchi	• • •	962
93 Evaluation of property of inertinite in coal (Development of technology for producing high strength coke-5)	Y.Kubota	• • •	963
94 Measurement for dilatation of coals under microwave heating	Y.Dohi	• • •	964
95 Examination of reactivity of charcoal carbonized from biomass with oxygen concentration cell	K.Takahashi	• • •	965
96 Effect of coal and coke particle size on coke reactivity and strength	J.Choi	• • •	966
97 Reaction behavior of highly reactive Ca-coke (Improvement of blast furnace reaction efficiency by use of highly reactive coke -6)	S.Nomura	• • •	967
98 Evaluation of coking property of high-performance caking additive and asphalt pitch	T.Shishido	• • •	968
99 Influence of granulating process on strength distribution of coke grains (Evaluation of coke strength with materials mechanics approach -1)	H.Hayashizaki	• • •	969
100 Affect of coal moisture on gas permeability of charged coal	S.Miyashita	• • •	970
101 Influence of clearance in oven width direction on coke pushing force	T.Nakagawa	• • •	971

102	Surface tension measurement of liquid iron under controlled activities of oxygen and carbon using gas/liquid equilibrium method	K.Morohoshi	• • •	972
103	Influence of oxygen partial pressure on surface tension of molten iron	S.Ozawa	• • •	973
104	Time-resolved x-ray diffraction on the solidification of undercooled liquid of binary Fe-based alloys	A.Mizuno	• • •	974
105	(ISIJ Research Promotion Grant)Normal spectral emissivities for solid Fe and Fe-C alloys at high temperatures	Y.Matsukawa	• • •	975
106	Role and the reliability of thermophysical properties of the melts in high temperature processes	Y.Sato	• • •	976
107	Noncontact measurement of normal spectral emissivity of molten Cu electromagnetically levitated in a dc magnetic field	H.Kobatake	• • •	977
108	Thermal conductivity measurements of Sb-Te binary alloys by hot strip method	R.Lan	• • •	978
109	Viscosity measurement of molten SiGe using high temperature oscillating viscometer	M.Mukai	• • •	979
110	(ISIJ Research Promotion Grant)Influence of shear stress on crystallization behavior of CaO-SiO ₂ -R ₂ O system	K.Kusada	• • •	980
111	Measurement of sound velocity and ultrasonic absorption of molten CaO-SiO ₂ -Na ₂ O slags	Y.Matsuzono	• • •	981
112	Frequency dependency of sound velocity and ultrasonic absorption of 33mol%Li ₂ O-67mol%SiO ₂ glass	Y.Kitamura	• • •	982
113	Effect of oxygen partial pressure on wettability between molten SiO ₂ -Na ₂ O and solid Cu substrate	M.Nakamoto	• • •	983
114	Viscosity and structure of alkali silicate melts	T.Nagahisa	• • •	984
115	Quantitative estimation of heat transfer behavior through the mold flux film	S.Mineta	• • •	985
116	Effects of cuspidine grain size on optical properties and radiative heat transfer in mould fluxes	A.Kushimoto	• • •	986
117	Influence of fluoride on physical properties of molten mold fluxes	M.Hanao	• • •	987
118	Effect of alkali oxide addition on the desulfurization rate from molten steel by CaO-SiO ₂ -Al ₂ O ₃ -MgO based flux	E.Takada	• • •	988
119	Effects of static magnetic field on dendritic growth of metallic alloys	H.Yasuda	• • •	989
120	Preliminary trial of X-ray imaging and diffraction measurement for δ / γ transformation in 045mass%C steel	H.Yasuda	• • •	990
121	Dendrite arm fragmentation at δ / γ boundary	H.Yasuda	• • •	991
122	Influence of carbon concentration on δ / γ transformation following solidification	M.Kiire	• • •	992
123	(Invited Lecture)X-ray imaging of solidification processes and microstructure evolution	L.Arnberg	• • •	993
124	(Invited Lecture)X-ray videomicroscopy of dendritic solidification in aluminium alloys	L.Arnberg	• • •	994
125	In-situ observation of microstructural changes of steel during hot deformation	Y.Yogo	• • •	995
126	Developments of hybrid in-situ observation system	H.Terasaki	• • •	996
127	Recent researches on fundamentals and application of microwave processing to materials and environmental technology	N.Yoshikawa	• • •	997
128	Manufacture of monodispersed spherical silicon for solar cells by intermittent electromagnetic force	T.Takei	• • •	998
129	Effect of magnetic field imposition on ZnTe electro-deposition	T.Kozuka	• • •	999
130	Effect of electromagnetic vibration on solidified microstructure of Sn-Pb alloy	R.Tokushige	• • •	1000
131	Effect of microwave H-field heating for structure transformation of titanium oxides	J.Fukushima	• • •	1001
132	Tracking technology of burden materials for blast furnace with bell-less top by using RFID (Measurement of burden materials discharging behavior from bell-less top bunker-1)	K.Nakano	• • •	1002
133	Evaluation of burden discharging behavior of bell-less top blast furnace by using RFID (Measurement of burden materials discharging behavior from bell-less top bunker-2)	T.Natsui	• • •	1003
134	Drainage characteristics due to different dripping distributions	Yen Chih Chen	• • •	1004
135	Effect of natural convection on the flow and heat transfer in the blast furnace hearth	K.M.Komiyama	• • •	1005
136	Gas permeability in pressed packed bed with liquid	J.Ishii	• • •	1006
137	Transient flow behavior of gas and powder flows in packed bed	K.Kumagai	• • •	1007
138	Influence of blast furnace profile and deadman on solid motion analyzed by DEM	S.Igarashi	• • •	1008
139	Effect of mixing conditions of Iron-coke on reduction efficiency in blast furnace	H.Yokoyama	• • •	1009
140	Descending behavior of solid material in vertical type coke oven furnace calculated by DEM	K.Kojima	• • •	1010
141	Analysis of particle segregation during charging into the surge hopper by DEM	H.Mio	• • •	1011
142	The operation with large amount of nut coke at Kakogawa No.2 BF	Y.Yamano	• • •	1012
143	Development of mixed coke control technique on center feed type bunker	Y.Kashihara	• • •	1013
144	Development of mixed coke ratio control technique on parallel type bunker	A.Murao	• • •	1014
145	Increase and decreasing in production at Kashima No.1 and No.3 blast furnace	T.Kishino	• • •	1015

Environmental, Energy and Social Engineering

Lecture No.	Title	Speaker	Page
Plenary Session			
146	Dissolution behavior of various ions in steelmaking slag to seawater	H.Atsumi	• • • 1016
147	Influence of the mass ratio of steelmaking slag and seawater on the elution behavior of elements	X.Zhang	• • • 1017
148	Influence of Fe ion on phytoplankton growth	T.Okuyama	• • • 1018
149	Dissolution of chromium and zinc from EAF slags in water with wet grinding method	M.N.N Hisyamudin	• • • 1019
150	Continuous Ni ion removal process from nickel rinse water by magnesium alloy (Removal of harmful metal in wastewater and recovery of valuable metal-4)	N.Sakamoto	• • • 1020
151	Creation of metal and alloyed metal nanoball by submerged glow discharge	S.Yatsu	• • • 1021

152 Steel industry and a hydrogen energy society :Efforts in the past and for future	I.Jitsuvara	• • •	1022
153 Thermodynamic study of hydrogen production process by using converter slag	H.Matsuura	• • •	1023
154 Measurement of the oxidation rate of solid iron by H ₂ O gas through a slag film	G.Abukawa	• • •	1024
155 Outline of COURSE50 and influence of injecting hydrogen gas into blast furnace	S.Matsuzaki	• • •	1025
156 Thermodynamically feasibility study on carbon recycling iron making system	Y.Kato	• • •	1026
157 An ironmaking process using hydrogen from HTGR-IS process (Specific energy and carbon consumptions of the ironmaking process using hydrogen partial reduced ore at locality)	M.Ogawa	• • •	1027
158 Economical feasibility study on the long distant transportation technologies of electricity derived from renewable energy	K.Fukuda	• • •	1028
159 Development of hydrogen supplier using redox reaction of iron oxide	K.Asai	• • •	1029
160 Influence of foreign oxide coating and gaseous sulfur on hydrogen production using redox cycle reaction of iron oxide	N.Nishizawa	• • •	1030
161 Characteristics of hematite reduction with ammonia at low temperature	S.Hosokai	• • •	1031
162 Carbon deposition from biotar vapor on sinter	K.Matsui	• • •	1032
163 Times changed and nowadays holonomical management	E.Kanoshima	• • •	1033
164 Safety education and nowadays holonomical management (1)Risk homeosataasis	E.Kanoshima	• • •	1034
165 Human factors in the holonomical management,nowadays(1)	T.Noda	• • •	1035
166 Human factors in the holonomical management,nowadays(2)	T.Noda	• • •	1036
167 Evaporation behavior of components from CaO treated EAF dust under wet air stream	R.Chairaksa	• • •	1037
168 Alkaline leaching of zinc from CaO treated EAF dust	K.Maruyama	• • •	1038
169 Material flow analysis on zinc associated with steel making dust in Korea	Y.Jeong	• • •	1039
170 Measurement of the reflection spectrum of a surface treated Japanese sword	S.Maneyama	• • •	1040
171 Steel recycling circuit in the world	N.Takamatsu	• • •	1041
172 The estimation of recovering rate of obsolete scrap	N.Takamatsu	• • •	1042
173 Physical adsorption technology for the separation of blast furnace gas	Y.Mogi	• • •	1043
174 Fundamental flow characteristics in a double-film-robber heat exchanger	Y.Inomata	• • •	1044
175 Ice transportation system utilizing waste heat at low temperature	T.Nomura	• • •	1045

Instrumentation, Control and System Engineering

Lecture No.	Title	Speaker	Page
Plenary Session			
176	Image reconstruction of minute flaw's 3D figure by synthetic aperture method using focused beam	T.Ozeki	• • • 1046
177	Development of an automated spark testing technique	T.Nakata	• • • 1047
178	Vehicle routing scheduler of coil products	Y.Yoshinari	• • • 1048
179	Improvement in productivity of plate shipment by barcode handling	T.Nakamide	• • • 1049
180	New monitoring technique for buckling in CAL using canonical analysis	T.Hirata	• • • 1050
181	Development of automatic combustion control model for reheating furnaces in plate mill	K.Kita	• • • 1051
182	Management of zinc bath temperature in continuous galvanizing line	C.Jee	• • • 1052
183	Measurement and control of camber in hot rolling mills	I.S.Choi	• • • 1053
184	Development of coiling temperature control using fountain pyrometers in a hot strip mill	H.Tachibana	• • • 1054

Processing for Quality Products

Lecture No.	Title	Speaker	Page
Plenary Session			
185	(Invited Lecture)Cutting process considering the plastic flow layer in the machined surface	K.Yoshida	• • • 1055
186	TEM observation of microstructure of built-up edge formed by machining in structural steel	T.Aiso	• • • 1056
187	Effect of some factors on surface roughness in low carbon resulfurized free cutting steel	T.Shiraga	• • • 1057
188	Machinability of h-BN added austenitic stainless steel	M.Kawajiri	• • • 1058
189	Effect of soluble nitrogen on machinability of microalloyed steels in MQL drilling	K.Watari	• • • 1059
190	Machinability of ferrous PM material	H.Tanaka	• • • 1060
191	Effect of rolling conditions on hot rolling lubrication	Y.Matsubara	• • • 1061
192	Trial of applying air atomization supply method to oil lubricant in hot rolling	T.Inoue	• • • 1062
193	Lubricating property of the calcium carbonate in hot rolling	N.Shimotomai	• • • 1063
194	Characteristics of high temperature lubricating in warm or hot formation by the multi-function type Bowden tester	J.Ikeda	• • • 1064
195	Effect of scale on coefficient of friction in hot rolling of high strength steel with 590MPa	A.Azushima	• • • 1065
196	Behavior of oxide scale on Si bearing steel during hot rolling	K.Hara	• • • 1066
197	Effect of bar temperature on red scale formation (Prevention of red scale formation during hot rolling of steels-4)	H.Okada	• • • 1067
198	Influence of tribological condition on cold rolling load of high-tensile steel	T.Shiraishi	• • • 1068
199	Friction coefficient measurement for hot forging	T.Fujimoto	• • • 1069

200 Effect of lubricant in hot stamping of 22MnB5 steel	K.Uda	• • •	1070
201 Effect of surface roughness of die and scale thickness on coefficient of friction in hot stamping	A.Yanagida	• • •	1071
202 Improvement of bead formation of plasma MIG welding in pure argon atmosphere	T.Katayama	• • •	1072
203 Dynamic simulation of MIG welding with change in discharge gap	Y.Tsujimura	• • •	1073
204 Experimental observation of metal vapor behavior in the plasma of helium TIG welding	H.Sawato	• • •	1074
205 Analysis of relative density of metal vapor and plasma temperature in TIG welding	K.Ito	• • •	1075
206 Total numerical modeling of TIG welding	T.Zeniya	• • •	1076
207 Total numerical simulation model of AC TIG welding	S.Tashiro	• • •	1077
208 In-situ observation of martensite transformation and retained austenite in supermartensitic stainless steel	S.Zhang	• • •	1078
209 <i>In-situ</i> observation of intragranular ferrite nucleation on BN in heat affected zone	Y.Shintaku	• • •	1079
210 Analysis for acicular ferrite in weld metals of ESW,SAW,GMAW	A.Takada	• • •	1080
211 In-situ observation of phase formation in Ti-6Al-4V alloy during simulated welding heat cycle	Y.Yamamoto	• • •	1081
212 Effect of Si contents on microstructures and hardness in resistance spot welds of DP steels	C.Y.Kang	• • •	1082
213 Heating and melting behavior of high frequency electro resistance welding process-1	T.Okabe	• • •	1083
214 Heating and melting behavior of high frequency electro resistance welding process-2	H.Yokoyama	• • •	1084
215 (ISIJ Research Promotion Grant)Evaluation of diffused bonding interface using ultrasonic imaging	T.Mihara	• • •	1085
216 Development of new friction stir welding tool made of Co-based alloy	Y.S.Sato	• • •	1086
217 Joining of aluminum alloy to stainless steel by vacuum brazing with hot-dip aluminized stainless steel	Y.Nakane	• • •	1087
218 Establishment of the prepress width reduction technology in Oita works (Development of Crop-Loss decreasing technology in width reduction process-1)	H.Nakajima	• • •	1088
219 Evaluation for crop deformation behavior by FEM analysis and actual process application (Development of Crop-Loss decreasing technology in width reduction process-2)	Y.Nakamura	• • •	1089
220 Improvement of press load prediction and application of head-leveling with buckling prevention (Development of Crop-Loss decreasing technology in width reduction process-3)	T.Kiyosue	• • •	1090
221 Flow characteristics of a circular water jet impinging on a moving surface covered with water film	Y.Suzuki	• • •	1091
222 Effects of scale type and scale thickness on spray cooling characteristics	H.Fukuda	• • •	1092
223 Application of super high-temperature heat flux gauge on water cooling of hot steel plate	J.Lee	• • •	1093
224 Forming limits of steel tube subjected to combined stress paths without intermediate unloading	T.Kuwabara	• • •	1094
225 Evaluation of ductile fracture property in tube tensile test using image analysis	Y.Yoshida	• • •	1095
226 Evaluation of ductile fracture parameters of steel tube using flaring test	K.Manabe	• • •	1096
227 Effect of experimental conditions on deformation behaviors in axial compression of steel tube	S.Yoshihara	• • •	1097
228 Evaluation of formability for hydroforming with forming allowance	M.Mizumura	• • •	1098
229 Formability evaluation of ERW steel tubes by internal pressure and axial feeding	A.Shirayori	• • •	1099
230 Estimation of formability of steel pipe by rubber bulge test and ring tensile test	H.Yoshimura	• • •	1100
231 Bend formability of thin wall high tensile tube in hydraulic bender (Fundamental property of hydraulic bend processing method)	K.Chuma	• • •	1101
232 Mechanical properties of high-temperature sintered and carburized compacts made of molybdenum hybrid-alloyed steel powder	S.Unami	• • •	1102
233 (Invited Lecture)Development of the Fe ₂ VAl thermoelectric module by powder metallurgy technique	M.Mikami	• • •	1103
234 Metal injection molding of Inconel 718	H.Miura	• • •	1104
235 Fabrication and mechanical properties of extruded high strength Cu40Zn brass with Ti addition by powder metallurgy	S.Li	• • •	1105
236 (Invited Lecture)Densification behavior of metallic glassy powders by their viscous flow	N.Yodoshi	• • •	1106
237 Simulation of sintering and shrinkage behavior under external stress	H.Matsubara	• • •	1107
238 (ISIJ Research Promotion Grant)Microstructure control of Al alloy using friction stir powder processing(FSPP)	H.Fujii	• • •	1108
239 Elastic and anelastic behavior of ceramics and cermets	K.Nishiyama	• • •	1109
240 Production of fine spherical high melting point metal powder by hybrid atomization	K.Minagawa	• • •	1110
241 Effect of material structure on the rolling contact fatigue strength of sintered Ni alloy steel	H.Miura	• • •	1111
242 Characteristic improvements of ferrous alloy sintered compacts by controlling particle size distribution	Y.Nakagomi	• • •	1112
243 The compact continuous cold rolling system(TCRS);1st report	S.Kaga	• • •	1113
244 Development of automatic gauge control method at ultra low speed rolling (The compact continuous cold rolling system;2nd report)	T.Saito	• • •	1114
245 Rolling deformation analysis at step caused by welding (The compact continuous cold rolling system;3rd report)	T.Saito	• • •	1115
246 Development of cross seam welder(CSW) for cold steel rolling application (The compact continuous cold rolling system;4th report)	N.Tominaga	• • •	1116
247 Development of TATSUMAKI friction stir welding for continuous cold rolling system of nonferrous material (The compact continuous cold rolling system;5th report)	Seung Hwan C.Park	• • •	1117
248 TATSUMAKI friction stir welding for thin sheet of nonferrous material (The compact continuous cold rolling system;6th report)	Seung Hwan C.Park	• • •	1118
249 Strip curvature in single driven rolling	D.Kasai	• • •	1119
250 Compensation method for plate temperature distribution for OPL (Development of NSC intelligent mill-14)	T.Otsuka	• • •	1120
251 Camber control system of OPL(Oita plate leveler) (Development of NSC intelligent mill-15)	K.Yamada	• • •	1121

252 Application of automatic grinding to temper mill rolls	Y.Nagami	• • •	1122
253 Skinpass rolling characteristic of tinplate using dull work roll	T.Akashi	• • •	1123
254 FEM analysis roller leveling for plate-2	T.Watanabe	• • •	1124
255 Estimation of rolling stress at center hole of round bar	T.Katsumura	• • •	1125
256 Investigation of deformation behavior in universal rolling of narrow flange width H beam	Y.Takashima	• • •	1126
257 Revamping of ϕ 140mm free floating mandrel mill of Baosteel	Q.Xie	• • •	1127
258 Microstructural evolution and flow stress of semisolid SKD61 tool steel	Y.Meng	• • •	1128
259 Compaction behavior on compressive torsion processing of iron base powder	H.Suzuki	• • •	1129
260 Influence of slide motion on dimensional accuracy of cold backward extrusion by using servo press	N.Yukawa	• • •	1130
261 Analysis of elastic-plastic deformation, temperature and microstructure using SPAM (Smoothed particle applied mechanics)	J.Yanagimoto	• • •	1131
262 Development of side bending test with optical observation (Estimation of stretch flange-ability by side bending test-1)	K.Sato	• • •	1132
263 Effect of shear angle to stretch flange-ability (Estimation of stretch flange-ability by side bending test-2)	T.Matsuno	• • •	1133
264 Springback of ultra thin Ti sheet after cold and warm forming	K.Ikeuchi	• • •	1134
265 Influence of forming conditions on thickness change in spinning forming of welded steel pipe-3 (Deformation in spinning forming of welded steel pipe-4)	K.Nishio	• • •	1135
266 Development of low YR type 780MPa class steel pipes for building structure	T.Yamaguchi	• • •	1136

Microstructure and Properties of Materials

Lecture No.	Title	Speaker	Page
Plenary Session			
267	TTP behavior of Ni-Fe based superalloy for advanced USC turbine rotor materials	S.Ohsaki	• • • 1137
268	Development of austenitic heat-resistant steel for efficient coal fired power plant boiler	A.Sho	• • • 1138
269	Evaluation of stress relaxation cracking sensitivity of Ni-base alloys	H.Okada	• • • 1139
270	Hot-working characteristic of the nickel base corrosion resistant alloy	Y.Bao	• • • 1140
271	Grain boundary precipitation strengthening due to Fe ₂ Nb laves phase in creep of Fe-20Cr-30Ni-2Nb austenitic heat resistant steel	I.Tarigan	• • • 1141
272	Effect of intragranular γ' (Ni ₃ Nb) phase on creep resistance of Fe-20Cr-30Ni-2Nb steels	N.Kanno	• • • 1142
273	Influence of heat treatments on precipitation of γ' phase in wrought Ni-base alloys	K.Izumi	• • • 1143
274	Effect of phosphorus on creep rupture strength of 17Cr-14Ni-7W and 17Cr-14Ni-6W steels	M.Morimitsu	• • • 1144
275	Influence of δ -ferrite on high temperature oxidation behavior of SUS304 slab	T.Kawagoe	• • • 1145
276	(ISIJ Research Promotion Grant) Dependence of activities of hydrogen and oxygen on hydrogen concentration dissolved in n-type Cr ₂ O ₃ scale at 1273K	M.Tanaka	• • • 1146
277	Evaluation of ultra-low strain rate creep behavior in modified 9Cr-1Mo steel by the helical spring creep test	S.Yamasaki	• • • 1147
278	Relation between long term strength and transition creep of 9Cr-W steel	M.Tamura	• • • 1148
279	Effect of creep plastic deformation on the degradation of nano-scale precipitates in strength enhanced ferritic steels	Hassan Ghassemi Armaki	• • • 1149
280	Creep rupture life assessment of high Cr ferritic steels using hardness measurement	R.Chen	• • • 1150
281	Effects of boron content variation and heat treatment on creep rupture strength of ferritic heat resistant steels	K.Asakura	• • • 1151
282	Effect of nickel and aluminum on long term creep rupture strength of 10Cr heat resistant steels	M.Arai	• • • 1152
283	Creep strengths of precipitation strengthened 15Cr ferritic steels at 973 and 1023K	Y.Toda	• • • 1153
284	Evaluation of creep damage behavior for high Cr steel welded joints by measurement method of strain distribution in local area	S.Kunifusa	• • • 1154
285	Microstructure evolution in high Cr heat resistant steel welded joints during creep deformation	Y.Liu	• • • 1155
286	Effect of solute carbon on development of microstructures in cold-rolled steels	T.Kubota	• • • 1156
287	Thermal stability and influence on mechanical property of retained austenite included in high-C high-Cr steel	G.Tanaka	• • • 1157
288	Effect of antimony on the magnetic properties in non-oriented electrical steel containing 3.2 wt.% silicon	J.Park	• • • 1158
289	Effect of manganese partitioning during intercritical annealing on austenite retention in low alloy TRIP-assisted steel sheets	T.Nakagaito	• • • 1159
290	A kinetic model for growth and successive dissolution of grain-boundary cementite (Calculation of microstructure change in vacuum carburizing -3)	K.Tanaka	• • • 1160
291	In-situ observation of martensite microstructure development in steels	N.Shibuta	• • • 1161
292	Elastic strain analysis in pearlite by EBSD-Wilkinson method	N.Koga	• • • 1162
293	Effects of B and Nb addition on bainite transformation of low carbon steel	N.Takayama	• • • 1163
294	Effects of ausforming on bainite and martensite structures in low carbon steel	N.Iwata	• • • 1164
295	Effect of Nb on grain size of reverse austenite from martensite in low carbon low alloy steel	Y.Ueda	• • • 1165
296	Dynamic stress intensity factors for pipe during crack propagation	M.Mitsuya	• • • 1166
297	Ductile crack initiation of pipeline girth welded joints with HAZ softening	H.Motohashi	• • • 1167
298	Fatigue crack propagation properties on microstructure of low carbon bainite steel	M.Kaneko	• • • 1168
299	Fatigue crack propagation tests of rail steel under mixed mode I + III loading	M.Akama	• • • 1169
300	Characteristics of calculated CTOD values	Y.Kayamori	• • • 1170

301 Evaluation of three-dimension fracture process for ductile fracture propagation	T.Amano	• • •	1171
302 Effect of impact load on crack arrest behavior in ESSO test-2	H.Shimizu	• • •	1172
303 Influence of humidity on bending fatigue in quench-tempered high-carbon steel -sheet	S.Tagashira	• • •	1173
304 Effects of dissolved hydrogen and hydride on hydrogen embrittlement susceptibility of pure titanium	H.Fukushima	• • •	1174
305 Influence of hot-rolled microstructure on mechanical properties after annealing in V-bearing steel sheets	H.Saito	• • •	1175
306 Formability enhancement of ultra high strength steel sheets by combining tempered martensite with bainite containing retained austenite	H.Matsuda	• • •	1176
307 Evaluation of the effects of the inclusion distribution on the local ductility of dual-phase steel (Fundamental investigations to clarify the mechanism governing local ductility-4)	Y.Suwa	• • •	1177
308 Effect of ferrite grain boundary on aging behavior of Nb-bearing ultra-low carbon steel sheets	Y.Ono	• • •	1178
309 Influence of paint baking treatment on hydrogen entry into deformed steel sheets	Y.Toji	• • •	1179
310 Crystal orientation dependence on cold-rolled deformation structure in ferritic stainless steel	Y.Katagi	• • •	1180
311 Effect of ausforming on nanobainite steel	W.Gong	• • •	1181
312 Precipitation phenomena and grain growth of Nb and Nb,Ti-IF steels	T.Kizu	• • •	1182
313 Effect of carbo-sulfide microstructure on mechanical fretting characteristics of Si-Cr steel	K.Ohishi	• • •	1183
314 Influence of manganese and sulfur concentration on fine MnS formation	S.Yoshida	• • •	1184
315 Effects of surface treatment processes on formation behavior of deformation-induced layer in Fe-Ni alloys	H.Sato	• • •	1185
316 Influence of Fe oxidation on selective oxidation behavior of Si and Mn	Y.Fushiwaki	• • •	1186
317 Effect of cooling pattern after hot-dip galvanizing on the formation of Fe-Al interfacial alloy layer	K.Akiba	• • •	1187
318 Effect of the cooling condition on spangle size of Zn-55%Al-1.6%Si galvanized steel sheet	K.Tokuda	• • •	1188
319 Microstructural analysis of the alloy layer(Fe ₂ Al ₃ ,FeAl ₃) formed on the interface between Al coating layer and Fe substrate	N.Takata	• • •	1189
320 Solubility of Fe in Al-Mg-Si melt at 973K	Y.Kamo	• • •	1190
321 Atmospheric corrosion characteristics of phosphated galvanized stainless steel sheet	M.Uranaka	• • •	1191
322 Improvement to chemical conversion phosphate coating for pretreatment of painting on high Si-added steel pipe by using strain(1) :Effect of strain	Y.Ishiguro	• • •	1192
323 Improvement to chemical conversion phosphate coating for pretreatment of painting on high Si-added steel pipe by using strain(2) :Application to high-Si-added steel pipe	Y.Ishiguro	• • •	1193
324 Validation of constitutive models for use in hydrocodes	T.Yokoyama	• • •	1194
325 Development of FE compression model with ultrasonic vibration (Development of plasticity processing system of difficult material to process-6)	T.Yoshida	• • •	1195
326 Molecular dynamics study of propagation velocity and direction of the fcc-bcc interface during phase transformation of iron	S.Tateyama	• • •	1196
327 Influence in steels on thermal magnetic properties	T.Tajima	• • •	1197
328 Effect of strain on loss factor of Si-added steel sheet	K.Fujita	• • •	1198
329 Estimation of grain boundary strength in the hall-petch coefficient of ferritic steel	S.Takaki	• • •	1199
330 Estimation of grain boundary carbon concentration in ferritic steel	S.Takaki	• • •	1200
331 Alloy element partition during proeutectoid ferrite transformation from hot-deformed austenite in an Fe-0.1C-3Mn-1.5Si alloy	M.Enomoto	• • •	1201
332 Boron concentration profile at grain boundary in steel measured by aberration corrected STEM	G.Shigesato	• • •	1202
333 Growth kinetics of proeutectoid ferrite in Fe-C-Mn-X alloys	R.Weil	• • •	1203
334 Influence of Ti/Al/O balance on acicular ferrite formation	H.Nako	• • •	1204
335 Crystal orientation of intragranular ferrite from B1 type compounds in steels	C.J.Lee	• • •	1205
336 Effects of complex oxide on acicular ferrite(AF) formation and charpy impact properties in heat affected zones at high strength steel	W.Cha	• • •	1206
337 Effect of microstructure on the growth behavior of NbC in hot-rolled steel	N.Kosaka	• • •	1207
338 (ISIJ Research Promotion Grant)Deformation structures in Ni-base alloys and their phase separation behaviour	T.Moritani	• • •	1208
339 Microstructure of a martensitic stainless steel embrittled by low temperature aging	Y.Tomio	• • •	1209
340 Decrease of electromagnetic waves leakage from aperture in a box by surface loss of steel sheet	T.Igarashi	• • •	1210
341 Effects of surface composition and contact force on electromagnetic shielding performance of metallic material's surfaces	K.Yuasa	• • •	1211
342 Improvement in oxidation resistance of iron by powder eutectic coating	M.Ishino	• • •	1212
343 Analysis of hydrogen trapping site using artificially produced Fe/TiN multilayers PartV	K.Sasakawa	• • •	1213
344 Analysis of hydrogen trapping site using artificially produced Fe/TiN multilayers partVI	T.Wakabayashi	• • •	1214
345 Investigation of entry and permeation of hydrogen in Zn and Zn alloy coated steels by electrochemical permeation method	Y.Miura	• • •	1215
346 Relation between stress corrosion cracking and microstructure at Ni-base alloy/low-alloy steel interface of a dissimilar metal weld	S.Nagayama	• • •	1216
347 Effect of sulfate and chloride ions on the rust composition of weathering steels	T.Ohtsuka	• • •	1217
348 Role of phosphate species on the transformation of GR I(Cl ⁻)	Gadadhar Sahoo	• • •	1218
349 Corrosivity of atmospheric environment in forest area	T.Shinohara	• • •	1219
350 (ISIJ Research Promotion Grant)pH measurement of aqueous solutions on metals by Atomic force microscopy	E.Tada	• • •	1220
351 Effect of hot-rolling condition on microstructure after spheroidizing of high-carbon hot-rolled steel sheets	H.Kimura	• • •	1221

352 Influence of secondary phase on crack propagation behavior of hot-rolled high tensile strength steel sheets (Study on dominant factor of stretch flange-ability of hot-rolled high-tensile strength steel sheets-3)	Y.Takahashi	• • •	1222
353 Difference in mechanical properties of high strength ferritic sheet steels caused by difference in particle hardness	Y.Funakawa	• • •	1223
354 Influence of microstructure on yield strength in Ti added low carbon steel sheet	T.Yokoyama	• • •	1224
355 A model for interphase precipitation based on finite interface solute drag theory	R.Okamoto	• • •	1225
356 Austenitization of 0.2C microalloyed steel during rapid heating	T.Nishibata	• • •	1226
357 Crystallographic feature of the grains with ϵ -martensite transformation during tensile deformation in high Mn steel	Y.Takagi	• • •	1227
358 Structure and magnetic properties of FeCo alloys synthesized by liquid process	S.Suzuki	• • •	1228
359 The effects of grain boundaries on magnetic domain patterns in Fe-Si bi-crystals	T.Wakisaka	• • •	1229
360 Modeling of magnetic domain in grain-oriented electrical steel sheets III	H.Yamaguchi	• • •	1230
361 Effect of inhibitor intensity and grain boundary energy on goss-grain evolution in grain-oriented electrical steel	Y.Ushigami	• • •	1231
362 Influence of coating tensile stress on magnetostriction waveform of grain-oriented electrical steel	G.Kijima	• • •	1232
363 Effect of stress on magnetic behavior of 3%Si-Fe{110} <uvw> crystal-2 (Magnetizing force and core loss at domain wall displacement)	M.Fujikura	• • •	1233
364 Evaluation of effects of polycrystallinity on work hardening Plastic deformation of double-cylindrical bicrystals of a Cu alloy	S.Onaka	• • •	1234
365 Extended finite element analysis of driving forces of defects in discrete dislocation model	A.Nakatani	• • •	1235
366 Local deformation behavior in the vicinity of a grain boundary	T.Ohmura	• • •	1236
367 Work hardening behavior of pure titanium sheet under biaxial loading with large plastic strain	T.Kuwabara	• • •	1237
368 Work hardening mechanism in soft particle dispersion ferritic steel	N.Nakada	• • •	1238
369 The effect of morphology of cementite on tensile properties in ferrite-cementite steels	K.Miyata	• • •	1239
370 Tensile behavior of Ti,Mo-added low carbon steels with interphase boundary precipitated structures	N.Kamikawa	• • •	1240
371 (ISIJ Research Promotion Grant)Effect of formation of bainite nucleated within grain on both strengthening and toughness in steels	K.Nakai	• • •	1241
372 Effect of strain path on strain aging of ferritic steel	K.Nagai	• • •	1242
373 Estimation of strain aging for ferritic steel by neutron diffraction	T.Suzuki	• • •	1243
374 Effect of a large amount of carbon and nitrogen on work hardening and deformation structure in austenitic steel	M.Yoshitake	• • •	1244
375 Work hardening behavior with twinning and dynamic strain aging in an Fe-17Mn-0.9C steel	M.Koyama	• • •	1245
376 Work hardening and ϵ -martensite transformation during tensile deformation in fine-grained high Mn steel	R.Ueji	• • •	1246
377 Stacking fault energy dependence of work hardening rate in low and high nitrogen austenitic steels	T.Onomoto	• • •	1247
378 Effect of Ni-equivalent and stacking fault energy on tensile properties of meta-stable austenitic steels	T.Imanaga	• • •	1248
379 (ISIJ Research Promotion Grant)The brittle-to-ductile transition in Ni-free high nitrogen austenitic steels	M.Tanaka	• • •	1249
380 The effects of microscopic metallurgical factors on macroscopic deformation properties in dual phase steels with polygonal ferrite	J.Shimamura	• • •	1250
381 Inhomogeneous deformation behavior observed using high-precision markers in ferrite-martensite dual-phase steels	H.Minami	• • •	1251
382 Effect of microstructure on formation ductile fracture surface in steel plate	T.Fukahori	• • •	1252
383 Fourier analysis of pseudo ductile fractured surface made by shot treatment	N.Yamada	• • •	1253
384 Effect of grain size for the transcription property of the die shape in the micro forming of SUS304	M.Katoh	• • •	1254
385 Effect of temperature on the amount of dislocation strengthening in cold worked IF steel	Y.Tanaka	• • •	1255
386 The influence of Al on a brittle-to-ductile transition in ferrite single crystals	K.Maeno	• • •	1256
387 High total-balance martensitic steel suitable for hot stamping-1	T.Hanamura	• • •	1257
388 TWIP effect in a high manganese austenitic steel studied by in-situ neutron diffraction	Y.Nagata	• • •	1258
389 Critical stress condition for the onset of separation in high strength steel plates(2nd report)	H.Terazono	• • •	1259
390 Effect of Mn on CTOD properties in heat affected zone of Ti oxide steel (Investigations of toughness improvement in heat affected zone-1)	K.Fukunaga	• • •	1260
391 Effect of Mn and Ni segregation on ferritic transformation at the grain boundary (Investigations of toughness improvement in heat affected zone-2)	S.Taniguchi	• • •	1261
392 Tensile properties of hot-rolled steel sheet multilayered by carbon steels	C.Nagasaki	• • •	1262
393 Formability of multilayered steels with ultra-high-strength and high-ductility	S.Nambu	• • •	1263
394 Sharp impact properties of carbon-steel/copper laminated composite	S.Tagashira	• • •	1264
395 (ISIJ Research Promotion Grant)Simulation of the effect of microstructural heterogeneity in two-phase steel on strain history dependence of ductility	M.Ohata	• • •	1265
396 Analysis of square shell deep drawing of Ti-3Al-2.5V sheet	T.Ohwue	• • •	1266
397 Crystal plasticity finite elements analysis of fatigue deformation on ferrite single phase steel with huge crystal grains	E.Sakurada	• • •	1267
398 A study of strain partitioning in FCC alloy using EBSD-Wilkinson method	M.Ojima	• • •	1268
399 Prediction of elongation and breaking point in welded joint by finite element analysis	H.Nakamoto	• • •	1269
400 Giga-cycle fatigue properties for spheroidal graphite cast iron with high ductility	E.Takeuchi	• • •	1270
401 Gigacycle fatigue properties of SCM440 low-alloy steel	Y.Furuya	• • •	1271
402 Effect of hydrogen on gigacycle fatigue properties of SCM435 steel used for storage cylinder in hydrogen station	H.Hirukawa	• • •	1272

403 Analysis of a fish-eye fracture site in gigacycle fatigue of tempformed steel	N.Nagashima	• • •	1273
404 Effect of inclusion size on giga-cycle fatigue properties of SUJ2	H.Shimanuki	• • •	1274
405 Effect of relative humidity on friction and wear properties of high-carbon chromium alloy steel with nanocrystalline surface layer produced by wearing process	Y.Iguchi	• • •	1275
406 Rolling contact fatigue behavior of S45C tempered martensite steel by surface severe plastic deformation and induction heating and quenching	K.Koujina	• • •	1276
407 Evaluation of rolling contact fatigue damage around inclusion break away area in fully tempered martensite steel	S.Morooka	• • •	1277
408 Studies on sliding surface structure and wear resistance of eutectoid carbon steel	T.Maejima	• • •	1278
409 Ni-Al alloy transpiration-cooling devices containing microchannels	M.Omura	• • •	1279
410 Anodic oxidation of inner walls of the Microchannels in sintered titanium bodies produced by the sacrificial-core method	M.Ishida	• • •	1280
411 Hot-workability in the Ni ₃ (Si,Ti) base intermetallic compounds	T.Hagisawa	• • •	1281
412 Alloy designing and mechanical properties of Ni ₃ (Si,Ti) intermetallic alloys	Y.Kaneno	• • •	1282
413 (ISIJ Research Promotion Grant)Direct electrodeposition and electrolytic process of Ti and Ti alloy by using DC-ESR unit	H.Matsuo	• • •	1283
414 Delayed fracture characteristics of automobile high strength steel sheets with plastic strain	N.Wada	• • •	1284
415 Evaluation of delayed fracture characteristics of high strength steel sheet based on CSRT method(2nd report)	M.Matsuno	• • •	1285
416 Delayed fracture characteristics of boron-bearing high strength steel for use in bolt	H.Ishikawa	• • •	1286
417 <i>In-situ</i> observation of hydrogen effect on pure polycrystalline iron using electrochemical nanoindentation	K.Tomatsu	• • •	1287
418 Hydrogen embrittlement of girth weld metals for pipelines under cathodic protection-1 (Effect of hardness on maximum stress)	K.Isshiki	• • •	1288
419 Hydrogen embrittlement of girth weld metals for pipelines under cathodic protection-2 (Effect of retained γ phase on maximum stress)	T.Masugata	• • •	1289
420 Phenomenological aspect of hydrogen environment embrittlement of steels-4 (Crack propagation behavior of CT specimens in hydrogen gas environment-1)	H.Arashima	• • •	1290
421 Phenomenological aspect of hydrogen environment embrittlement of steels-5 (Crack propagation behavior of CT specimens in hydrogen gas environment-2)	H.Arashima	• • •	1291
422 Hydrogen trapping sites at dislocations and vacancies in α -Fe using thermal desorption spectrometer detected from low-temperature	Y.Sato	• • •	1292
423 Hydrogen trapping sites at dislocations and grain boundaries in α -Fe including carbon using thermal desorption spectrometer detected from low-temperature	N.Abe	• • •	1293
424 The first direct observation of hydrogen trapping sites in nano-sized TiC precipitates in steel by atom probe tomography	J.Takahashi	• • •	1294
425 Comparison of lattice defects induced by hydrogen and strain in tempered martensitic steel with different hydrogen degradation susceptibility	H.Ito	• • •	1295
426 Effect of tensile and compressive pre-loading on delayed fracture characteristics	T.Oba	• • •	1296
427 Change in hydrogen content under constant elastic stress of high-strength steels	T.Doshida	• • •	1297
428 Effect of existing states of hydrogen on flow stress and stress relaxation of pure iron	N.Taneichi	• • •	1298
429 Tensile and bending strengths of stainless steel sheets with strength-gradient through thickness direction	K.Tsuboi	• • •	1299
430 Work hardening behavior of temper rolled austenitic stainless steels during tensile deformation	K.Kimura	• • •	1300
431 Mechanical properties of temper rolled austenitic stainless steels for spring	T.Oshima	• • •	1301
432 Microstructures and mechanical properties of temper annealed metastable austenitic stainless steel	K.Adachi	• • •	1302
433 Effects of V or Nb addition and annealing temperatures on tensile properties of SUS 301L	M.Sawada	• • •	1303
434 Microstructure of SUS444 stainless steel by solution nitriding treatment	M.Yoshida	• • •	1304
435 Nitrogen absorption and improvement of corrosion resistance of stainless steels	F.Weil	• • •	1305
436 Effect of Ni content on crevice corrosion resistance of ferritic stainless steel	A.Kawano	• • •	1306
437 Effect of Mo on necking behavior during thermal fatigue test in ferritic stainless steels	T.Nakamura	• • •	1307
438 Thermal fatigue properties of Cu and Nb bearing ferritic stainless steels in the temperature range 200-750°C	K.Imakawa	• • •	1308
439 Thermal fatigue behavior of ferritic stainless steels	J.Hamada	• • •	1309
440 Effect of carbon content on high-temperature strength in Nb containing ferritic stainless steels	K.Kimura	• • •	1310
441 Effect of annealing temperature on the microstructure of S32750 duplex stainless steel in hydrogen atmosphere	T.Watanabe	• • •	1311
442 TEM observation of the oxide scale formed on Si bearing austenitic stainless steel in H ₂ O-containing atmosphere	Y.Fujimura	• • •	1312
443 New mechanochemical descaling method of stainless steel	T.Kasai	• • •	1313
444 Oxidation removal of tramp elements in carbon saturated iron	K.Yamaguchi	• • •	1314
445 Distribution of Pt in two immiscible liquids in Fe-Cu-C system	M.Nakamoto	• • •	1315
446 Contamination of steel with tramp elements estimated by substance flow analysis	I.Daigo	• • •	1316
447 Influence of Ni amount on surface hot shortness of high Cu-Sn bearing steels	A.Takemura	• • •	1317
448 (ISIJ Research Promotion Grant)Inhibition mechanism of surface hot shortness of copper containing steel by shot peening (Influence of shot peening on initial oxidation)	Y.Tanaka	• • •	1318
449 Effects of Al addition on austenite grain structure in casting and reheating processes of carbon steel	S.Kencana	• • •	1319
450 Effect of Ca on HAZ toughness	T.Kato	• • •	1320
451 Factors influencing fracture on weld heat-affected zone (Part.1 Characteristic of cleavage crack initiation point)	Y.Shimada	• • •	1321
452 Development of 6%Ni steel for LNG storage tanks	H.Furuya	• • •	1322

453	Effect of aluminum and niobium content on low temperature toughness of API 5L-X65 grade clad steel	Y.Izumiyama	• • •	1323
454	Effect of grain size on mechanical properties in bainite steel	H.Takada	• • •	1324
455	Development of materials for large-size universal joint (The 4th report:Strength evaluation of universal joint)	D.Kikuchi	• • •	1325
456	Development of ultra high-strength TRIP-aided bainitic ferrite steels with good hardenability (1 st report:Effects of alloying elements on microstructure and retained austenite characteristics)	J.Kobayashi	• • •	1326
457	Development of ultra high-strength TRIP-aided bainitic ferrite steels with good hardenability (2 nd report:Effects of alloying elements on toughness)	D.Ina	• • •	1327
458	Development of TRIP-aided annealed martensitic steels with good hardenability (1 st report:Effects of alloying elements on microstructure and retained austenite characteristics)	D.Fuji	• • •	1328
459	Development of TRIP-aided annealed martensitic steels with good hardenability (2 nd report:Effects of alloying elements on notch fatigue strength)	N.Yoshikawa	• • •	1329
460	Effect of sulfide inclusions on rolling contact fatigue life of bearing steels	K.Hashimoto	• • •	1330
461	Visualization of initial crack behavior of TiN origin in rolling contact fatigue process	T.Udagawa	• • •	1331
462	Effect of alloying elements on yield to tensile ratio of high strength tempered bainitic steel for chain	J.Yin	• • •	1332
463	Effect of V and Nb on wear resistance of 12CrMoV type tool steels produced by powder metallurgy	J.Saitoh	• • •	1333

Process Evaluation and Material Characterization

Lecture No.	Title	Speaker	Page
Plenary Session			
464	Two dimensional observations of nitrogen radicals in a microwave induced nitrogen plasma at atmospheric pressure	Y.Arai	• • • 1334
465	Development of advanced NMR technique for characterizing chemical species of trace amounts of fluorine in slag	T.Takahashi	• • • 1335
466	Local structural analysis on cross section of rust layer by using micro-beam XRF and XAFS	M.Nagoshi	• • • 1336
467	Development of stress measurement technique for individual grains in stainless steel by synchrotron white X-rays	K.Kajiwara	• • • 1337
468	The structure of nickel-titan alloy influences on some functions <i>in vitro</i> and <i>in vivo</i>	A.Ogawa	• • • 1338
469	Examination of method of evaluating cold-rolled oil by supercritical carbon dioxide extraction	T.Akiyama	• • • 1339
470	(ISIJ Research Promotion Grant)X-ray fluorescence spectra near solid-liquid and liquid-liquid interfaces	K.Tsuji	• • • 1340
471	Solid-liquid extraction of CaO in steel slags with carboxylic acid-containing solvents	H.Matsumiya	• • • 1341
472	Dependence of particle radius on helium microwave-induced plasma atomic emission spectrometry for fine particle analysis	Y.Okamoto	• • • 1342
473	Estimation of number density of precipitates in steels considering size distribution	Y.Tanaka	• • • 1343
474	Measurement of fine particle density and size distributions by FFF(field-flow fractionation) method	K.Mizukami	• • • 1344
475	Analysis of largest sulfide inclusions in low carbon steel by using statistics of extreme values	Y.Kanbe	• • • 1345
476	Isolation and determination of Fe-nitride in nitriding steels	K.Sakane	• • • 1346
477	Characterization of fine particles in liquid by DMA and ICP-MS	K.Fujimoto	• • • 1347
478	Development of quantitative analysis for solute elements in high tensile strength steel	S.Kinoshiro	• • • 1348