High Temperature Processes

Lecture No. Discussion Sessions	Title	Speaker	Page
The present state of the steel refining process and the expected future challenges			
D1	The development of steel refining technology of Japan in these 15 years	S.Kitamura	・・・ 527
D2	Effect of aggregation behavior of desulfurization flux on desulfurization rate of hot metal by mechanical stirring with impeller	N.Kikuchi	・・・ 531
D3	Water model evaluation for desiliconization reaction by mechanical stirrer in hot metal runner at blast furnace	T.Nakasuga	・・・ 535
D4	Dominating factors on behaviors of non-metallic inclusions at a solid/liquid interface in a solidifying low carbon steels	H.Shibata	・・・ 537
D5	Changes of nitrogen and sulfur composition in liquid steel by blowing CaO powder under reduced pressure	M.Numata	・・・ 539
D6	Removal of impurities in molten iron through successive three phases	H.Ono	・・・ 542
D7	Application of hydrothermal reaction to recycling process	T.Shimizu	・・・ 546
D8	Dissolution behavior of constituents into seawater from steelmaking slag	T.Miki	・・・ 550
D9	Water model experiment and numerical simulation on interaction between top blown jet and liquid bath	N.Asahara	・・・ 554
D10	Development of multi-scale and multi-phase analysis in refining process	S.Shimasaki	・・・ 558
Control of reduction equilibrium for mitigation of CO2 emission of blast furnace			
D11	Reaction behavior of carbon composite agglomerates in blast furnace	K.Higuchi	・・・ 560
D12	Reduction of reducing agent rate in blast furnace operation by carbon composite iron ore hot briquette	A.Kasai	・・・ 564
D13	(ISIJ Research Promotion Grant)Several kinds of contact and adjacent states and reaction behaviors between iron oxide and carbon	Y.Kashiwaya	・・・ 568
D14	Examination on optimum design of iron ore/carbon composite	K.Miura	・・・ 572
D15	Effect of iron ore properties in the carbon-ore composite on lowering the reduction temperature	T.Murakami	・・・ 576
D16	Influence of mixing coal composite iron ore hot briquette on blast furnace simulated reaction behavior in a packed mixed bed	S.Hayashi	・・・ 580
D17	Effect of characteristic of ore on gasification behavior of carbon iron composite	T.Sato	・・・ 584
D18	Enhancement of reduction rate of carbon iron-ore composite with sub-micron iron oxide coating	T.Ariyama	・・・ 588
D19	Affect of difference of placement or reactivity of iron-ore and carbon on iron-ore softening-melting properties	K.Sunahara	・・・ 592
D20	Effect of slag melting behavior on metal-slag separation temperature	K.Ohno	・・・ 596
D21	Effect of alkali oxide addition on the physical properties of iron-making slags	S.Sukenaga	・・・ 600
D22	Effect of cementite coexistence on carburization and melting behavior of reduced iron	T.Miki	・・・ 604
D23	Slag design with the aim of the low-temperature and speed-up of the carburization reaction	H.Ono	・・・ 608

Environmental, Energy and Social Engineering

Lecture No. Discussion Sessions	Title	Speaker	Page
Development of material strategy model for resources and environment-4			
D24	Basic consideration on replaces of materials in the 21st century	T.Nakamura	・・・ 611
D25	Global material flow analysis of steel based on the introduction of next-generation vehicles	H.Hatayama	・・・ 615
D26	Development of a long-term simulation model of material flow(2) -The CO_2 emission based on the long term view of the car industry-	A.Inaba	・・・ 617
D27	Material flow analysis on steel alloy elements associated with regional scrap generation	H.Ono	・・・ 620
D28	Substance flow of metals embodied in international trade	K.Nakajima	・・・ 624

Instrumentation, Control and System Engineering

Lecture No. Discussion Sessions	Title	Speaker	Page
The future prospects of agent technologies for maintenance and development of the "Field Force" in steel plants			
D29	A scenario for the image enhancement of agent technologies for development of the “Field Force”	H.Kobayashi	・・・ 628
D30	Agent-based reactive scheduling strategy	N.Fujii	・・・ 632
D31	Mathematical programming-based approach for designing an agent of experienced personnel in production scheduling	H.Tamaki	・・・ 634
D32	Modeling of skilled worker agents in a learning support system for unskilled workers in charge of production planing in steel production systems using machine learning	I.Hatono	・・・ 636
D33	Acquiring operation scheduling knowledge through learning classifier systems	T.Terano	・・・ 638
D34	Agent model for operation support of hot tandem rolling	M.Konishi	・・・ 640
D35	Ecological interface design for hot strip rolling mill	T.Sawaragi	・・・ 642

Processing for Quality Products

Lecture No. Discussion Sessions	Title	Speaker	Page

Recent trend in control technology of strip profile and flatness

D36 Review of profile and flatness control on sheet rolling — F.Fujita — 646
D37 Current situation and future prospects in three-dimensional analysis of profile of rolled sheet — J.Yanagimoto — 650
D38 Improvement of strip flatness in cluster-type mill by means of numerical simularion — R.Hamada — 654
D39 Development of NSC intelligent mill — S.Ogawa — 658
D40 Recent problems of flatness control in skinpass rolling of thin steel strips — H.Kijima — 662

Microstructure and Properties of Materials

Lecture No. Discussion Sessions | Title | Speaker | Page

Characteristics and control of biofilm on the materials surface

D41 Adhesion of oceanic life on the various metallic materials in marine environment — D.Kuroda — 666
D42 Immersion of iron and steel materials into marine environment at ise gulf and gene analysis of attached microorganism — H.Ikegai — 668
D43 Immersion of iron-steel slag into marine environment and biofilm formation — H.Kanematsu — 670
D44 Biofilm formation on the various metallic materials in a water-cooling system — N.Kamakura — 672
D45 Fundamental investigation on the effect of EPS in biofilms on microbial influential corrosion of steel — N.Hirai — 674
D46 Common properties among various biofilms — H.Morisaki — 676
D47 Mechanism of slime production and carbon steel corrosion in the gas field water — Y.Tanji — 677
D48 Microbiologically influenced corrosion of steel surfaces induced by biofilm of *Pseudomonas aeruginosa* — H.Ikegai — 679
D49 Measurement of Minimum Bactericidal Concentration of Ag,Cu,Zn,Mg,Co,Ni,Mn,Au,Pd,Cr,Ti,Sn,Pb,Al and V metallic ion for *S.aureus* and *E.coli* — N.Horikawa — 682
D50 Evaluation of antibacterial ability of the copper coated stainless steel and its dependency for the coating thickness — Y.Miyano — 684

Process Evaluation and Material Characterization

Lecture No. Discussion Sessions | Title | Speaker | Page

Advances of micro-structural analysis for characterizing material properties

D51 The speciation analysis of boron in coal fly ash with the aid of solid-state NMR and FIB-TOF-SIMS — S.Kashiwakura — 685
D52 Development of rapid X-ray diffraction system at high temperatures for observation of sintering — M.Kimura — 689
D53 *In-situ* XPS study on laser nitridation process on metallic surface — N.Ohtsu — 691
D54 Microstructural analysis of oxide layer on low carbon steel by BSE imaging controlled by acceleration voltage and take-off angle — T.Aoyama — 692
D55 In situ observation of reduction of iron oxides by XAFS — T.Takayama — 694
D56 (Invited Lecture)Characterization of deformed and recristallized structure of Co based superalloy with TEM, XRD and EBSD — T.Otomo — 696
D57 X-ray stress and strain analysis methods for ultimately textured materials — M.Imafuku — 700
D58 A new evaluation for macro and micro stress in polycrystalline metal using X-ray diffraction — N.Yamada — 704
D59 X-ray diffraction analysis of deformed microstructures of TWIP steel — S.Sato — 708
D60 Microstructural characterization of strain-induced martensitic transformation in TRIP steels — E.Kwon — 712

Recent progress in chemical methods of analysis related to iron and steel making utilizing a flow system and newly developed pretreatment system

D61 Application of solvent extraction techniques to a FI system for the steel samples — T.Taniai — 714
D62 Flow injection analysis of a micro amount of boron(borate) in iron and steel samples — I.Adachi — 716
D63 A device of continuous flow system by using both methods of chemiluminescence detection and sample continuous flow injection for determination of boron in steel — M.Ishii — 718
D64 Simple and rapid determination of molybdenum in iron and steel with spectrophotometric detection in-line coupled with separation in a flow injection system — T.Yamane — 722
D65 Precise determination of chromium in stainless steels using 1,5-diphenylcarbonohydrazide by stopped flow method — K.Watanabe — 725
D66 Elimination of Fe^{III} matrix for the determination of traces of metals by electrospray ionization mass spectrometry — K.Tsunoda — 727
D67 Effects of contaminants on blank value in the determination of trace silicon in steel samples by molybdosilicate blue spectrophotometry after silicon tetrafluoride separation — T.Ashino — 728
D68 Determination of tin and tellurium in iron and steel by combining solid phase extraction with TBP-impregnated resin in hydrobromic acid media and ICP-AES — K.Oguma — 730
D69 (Invited Lecture)Separation and preconcentration of trace amounts of elements in iron and steel by Ion-exchange-adsorption/Ion-pair-elution — N.Uehara — 731

New era of neutron scattering and diffraction as a tool for the steel research

D70 Development of the smaller-angle neutron scattering instrument(TAIKAN) in J-PARC and its application to structural analysis of iron steels — J.Suzuki — 735
D71 Possibility of in situ neutron diffraction on steels — S.Harjo — 738
D72 The current status of iMATERIA — T.Ishigaki — 739
D73 Structural analysis of multi-component calcium-ferrite by neutron powder diffraction — M.Imafuku — 740
D74 (Invited Lecture)Texture imaging by the wavelength resolved radiography based on an accelerator neutron source — Y.Kiyanagi — 743
D75 Measurement of texture by neutron diffraction — T.Suzuki — 744
D76 Neutron diffraction analysis on stacking fault energy and deformation microstructure — T.LEE — 748

D77 Optimization of multiphase textures measured by neutron diffraction	P.XU	・・・	752
D78 (Invited Lecture)Popularizing small-angle neutron scattering instruments	M.Furusaka	・・・	756
D79 Analysis of critical stress condition in hydrogen cold cracking of high strength weld metal by neutron diffraction	H.Sueyoshi	・・・	758
D80 Microstructure and deformation behavior of an ultrafine-grained electrodeposited iron	Y.Su	・・・	762
D81 Bainitic transformation behavior studied by simultaneous small-angle neutron scattering, neutron diffraction and dilatometer measurement	H.Nishijima	・・・	766
D82 (ISIJ Research Promotion Grant)Crystal orientation relationship between ω phase formed after HPT-straining and α phase after reverse-transformation in pure Ti	Y.Todaka	・・・	769
D83 Application of small-angle neutron scattering to steel research	M.Ohnuma	・・・	773