

Contents of the Technical Papers for the 71th Grand Lecture

Meeting of The Iron and Steel Institute of Japan.

CONTENTS

| Lect. No. | Title | Lecturer |
|-----------|--|--|
| 1 | On the Reduction of Iron Ore by a Batch Type Rotary Kiln. | <i>Dr. Minoru TANAKA, et ali.</i> ...223 |
| 2 | On the Sintering Prevention by Agitation on the Fluidized Bed Reduction. | <i>Dr. Minoru TANAKA.</i> ...225 |
| 3 | A Study on the Decrepitation of Iron Ores..... | <i>Shin-ichi INABA, et ali.</i> ...228 |
| 4 | Swelling of Iron-Ore Pellets during Reduction. | <i>Dr. Shiro BAN-YA, et ali.</i> ...231 |
| 5 | Effects of Bentonite on Characteristics of Green Balls. (Fundamental studies on pelletizing— I) | <i>Kyōichi NAGANO, et ali.</i> ...234 |
| 6 | On the Microstructure of the Pellets Containing Lime. (Study of the pellets containing lime— I) | <i>Reijirō NISHIDA, et ali.</i> ...237 |
| 7 | Study on the Slag Bonding Mechanism in Firing of Pellet | <i>Minoru SASAKI, et ali.</i> ...239 |
| 8 | Studies on Properties of Marcona Pellet..... | <i>Taizō NAKATA, et ali.</i> ...242 |
| 9 | Effect of Some Factors on the Properties of Pre-reduced Pellets. (Studies on the production of pre-reduced iron ore pellets— I)..... | <i>Koji KAMIYA, et ali.</i> ...244 |
| 10 | On the Condition of Formation of Fayalite from Iron Oxide and Silica. (The study of the formation and reduction of fayalite— I) | <i>Mamoru YAMADA, at ali.</i> ...246 |
| 11 | Microstructure of the Normal Sinter. (Standard method for the identification of the microstructure of the iron ore sinters— I)..... | <i>Dr. Teruo IKENO.</i> ...249 |
| 12 | Microstructure of the Lime Sinter. (Standard method for the identification of the microstructure of the iron ore sinters— II) | <i>Dr. Shojiro WATANABE.</i> ...251 |
| 13 | Relations between the Characteristics of Limestone and Sintering Procedures. | <i>Masahiko KAWAZU, et ali.</i> ...254. |
| 14 | Effect of Basicity and Silica Content on Properties of Lime Sinter. (Study of lime sinter— I)..... | <i>Masami YOSHIKAWA, et ali.</i> ...257 |
| 15 | On the Identification of Mineralogical Composition of Lime Sinter by Xray Diffraction. (Study of lime sinter— II)..... | <i>Akira OKAMOTO, et ali.</i> ...260 |
| 16 | On the Relation between the Properties and the Mineralogical Composition of Lime Sinter. (Study of lime sinter— III) | <i>Tomorō HAGIWARA, et ali.</i> ...262 |
| 17 | On the Heat of Oxidation- and Reduction-Reactions in the Process of Sintering. (Study on the sinter of iron ores— II)..... | <i>Yoshihiro IZEKI, et ali.</i> ...265 |
| 18 | On the Relation of Raw Materials of Sinter to the Reaction Heat of Oxidation- and Reduction-Reactions. (Study on the sinter of iron ores— III) | <i>Yoshihiro IZEKI, et ali.</i> ...268 |
| 19 | Effect of the Thickness Distribution of Sintered Ore on the Pallet on the Temperature Distribution of the Waste Gas in the Wind Box. (Studies on an automatic control of a sintering plant— I)..... | <i>Tadashi KAWAGUCHI, et ali.</i> ...271 |
| 20 | Construction and Operation of Ore Beneficiating Plant at Sakai Works. | <i>Toshio HITORA, et ali.</i> ...274 |
| 21 | On the Reduced Briquettes Made from Iron Bearing Fine materials. | <i>Akira SUZUKI, et ali.</i> ...276 |

To be held on April 5~7, 1966 at University of Tokyo.

| | | |
|----|---|--|
| 22 | Effect of Compacting Pressure and Quantity of Binder on Qualities of Metallized Briquettes. (Study of production of metallized briquettes from magnetic iron sand—Ⅲ)..... | <i>Akihiko TANAKA, et ali.</i> ...279 |
| 23 | On Production of Metallized Briquettes from Mixture of Iron Sand and Steelmaking Dust..... | <i>Hiroshi KATAYAMA, et ali.</i> ...281 |
| 24 | On the Grinding and Classifying for Separation of Chromium from Laterite..... | <i>Kazuhiro MIIDA, et ali.</i> ...284 |
| 25 | Selective Reduction-Magnetic Separation on Laterite..... | <i>Kyōichi NAGANO, et ali.</i> ...287 |
| 26 | On Extraction of Nickel from Iron Laterites by Segregation Roasting-Flotation Process..... | <i>Dr. Yoshikazu TAKAHASHI, et ali.</i> ...290 |
| 27 | State of Existence of Phosphor Contained in Iron Sand at Sea Bottom and Analysis of the State of Phosphor..... | <i>Takehiko SAKATA, et ali.</i> ...292 |
| 28 | Influence of Size Reduction of Ore. (Study on permeability of blast furnace— I) | <i>Yukihiko HIDA, et ali.</i> ...295 |
| 29 | Influence of Size Distribution of Pellet on Permeability. (Study on permeability of blast furnace— II) | <i>Takehiro HORIO, et ali.</i> ...298 |
| 30 | Effect of Burden Preparation on the Blast Furnace Operation..... | <i>Tetsuzō SAKEMI, et ali.</i> ...300 |
| 31 | Blast Furnace Practice with Marcona Pellet up to 60% in Burden..... | <i>Seisaku SUZUKI, et ali.</i> ...303 |
| 32 | Practice on Blast Furnace with High Sinter Burden Proportions..... | <i>Fujio SHIGEMORI, et ali.</i> ...306 |
| 33 | On Blast-Furnace Operation with Yard Coke..... | <i>Seiji SASAKI, et ali.</i> ...308 |
| 34 | Effect of Sponge Iron on Coke Rate. (Study of reduction process in shaft of blast furnace— I) | <i>Noritoshi INAGAKI, et ali.</i> ...310 |
| 35 | Pre-reduced Ore as Blast Furnace Burden..... | <i>Yasuyoshi MIZUNO, et ali.</i> ...313 |
| 36 | Consideration on an Oil Per Coke Replacement Ratio. (Studies for the improvement in the blast furnace practice— VII) | <i>Dr. Fumitada NAKATANI, et ali.</i> ...316 |
| 37 | Some Considerations about High Top Pressure Operation..... | <i>Mitsuru NOZAKI, et ali.</i> ...319 |
| 38 | Operation of the Huge Blast Furnace with the Top-Pressure Control..... | <i>Kenichirō KUSANO, et ali.</i> ...321 |
| 39 | Theoretical Analysis for Phenomena in the Combustion Zone of a Blast Furnace..... | <i>Teruo SHIMOTSUMA.</i> ...323 |
| 40 | Construction of No. 1 Blast Furnace at Sakai Works..... | <i>Kōzi YASUDA, et ali.</i> ...326 |
| 41 | Blowing-in and Operation of No. 1 Blast Furnace at Sakai Works..... | <i>Kazukiyo BEPPU, et ali.</i> ...329 |
| 42 | Charging Installation of No. 2 Blast Furnace at Tsurumi..... | <i>Takeo SATŌ, et ali.</i> ...331 |
| 43 | Reports of Hearth Briks Erosion at No. 2 Blast Furnace of Kawasaki Works, Nippon Kokan K. K..... | <i>Tadashi KOBAYASHI, et ali.</i> ...333 |
| 44 | On the Erosion Amount of Hearth Bricks in Blast Furnace..... | <i>Dr. Kazuo MIYAGAWA, et ali.</i> ...336 |
| 45 | On the Wear of Bosh Lining at Kokura No. 1 Blast Furnace..... | <i>Michiyasu YOSHIKI, et ali.</i> ...338 |
| 46 | On the Reduction of Iron Ore and the Absorption of Carbon at High Temperature Above 1300°C..... | <i>Fusatoshi EMOTO</i> ...340 |
| 47 | Distribution of Sulfur in Blast Furnace..... | <i>Yasushi NAKAMURA, et ali.</i> ...343 |
| 48 | Reduction and Thickening of Titanium Bearing Slags..... | <i>Dr. Atumi OHNO, et ali.</i> ...346 |
| 49 | Melting Practice of High Carbon Steel by LD Converter Process..... | <i>Jirō YAGI, et ali.</i> ...348 |
| 50 | Effect of the Blowing Condition on the Occurence of Slopping in Basic Oxygen Converter. (Study on the blowing in basic oxygen converter— I) | <i>Akira YAMAZAKI, et ali.</i> ...350 |
| 51 | Effect of the Addition of the Fluxing Agent on the Occurence of Slopping in Basic Oxygen Converter. (Study on the blowing in basic oxygen converter— II) | <i>Kyōichi AKAMATSU, et ali.</i> ...352 |
| 52 | On the Influences of Hot Metal Ratio in the LD Process..... | <i>Narito KIMURA, et ali.</i> ...355 |
| 53 | On Nitrogen Behavior in LD Operations..... | <i>Masaru MAKINO, et ali.</i> ...358 |
| 54 | Consideration on Decarburization Reaction in the Oxygen Process and Possibility of the Continuous Determination of the Bath Carbon. (Study on the computing control to an oxygen converter— I) | <i>Taiji ARAKI, et ali.</i> ...360 |

| | | |
|----|--|--|
| 55 | Development of the Control System in the Oxygen Process on the Basis of "The Decarburization Model" (Study on the computing control to an oxygen converter— I) | <i>Katukiyo MARUKAWA, et ali.</i> ...362 |
| 56 | Removal of Sulphur with Gases in LD Converter..... | <i>Yōzō TAKEMURA, et ali.</i> ...364 |
| 57 | Slag Formation and Dephosphorization in Early Slag of LD-Steelmaking Process..... | <i>Heichirou ISO, et ali.</i> ...366 |
| 58 | Construction and Operation of 50t Test LD Converter in Muroran Works. (Application of oxygen top blowing converters in existing open hearth mills by Fuji Iron & Steel Co., Ltd— I) | <i>Shigeru TOYOTA, et ali.</i> ...369 |
| 59 | Construction of 60t LD converter shop in Kamaishi Works. (Application of oxygen top blowing converters in existing open hearth mills by Fuji Iron & Steel Co., Ltd.— II) | <i>Shigeru TOYOTA, et ali.</i> ...372 |
| 60 | Construction of No. 3 Converter and 2-Unite Operation of 3 Converters at Wakayama Steel Works. | <i>Keigo IWASE, et ali.</i> ...375 |
| 61 | A Few Investigations for Regulations of High Tapping Temperature at LD Process..... | <i>Norio KUROSU, et ali.</i> ...378 |
| 62 | Change of the Bath Temperature in LD Converter. (Study on reactions in LD converter by sampling method during blowing— I) | <i>Takashi FUJII, et ali.</i> ...380 |
| 63 | Model Study on Design of Lance Nozzle. | <i>Ryōichirō IMAI, et ali.</i> ...383 |
| 64 | Effects of Single-Hole-Lance and Three-Hole-Lance on Blowing Condition. | <i>Masayuki HANMIYO, et ali.</i> ...386 |
| 65 | On the Newly Designed OG Equipment and Its Operational Performances. | <i>Masaaki TAKAHSHI, et ali.</i> ...389 |
| 66 | Reuse of Tar Dolomite Bricks after Service. (Lining of LD converter at be Kōbe Steel— II)..... | <i>Shōzou MITSUSHIMA, et ali.</i> ...391 |
| 67 | On the Continuous Measurement of Oxygen Pressure in Atmosphere Gas of an Open Hearth Furnace by the Oxygen Concentration Cell. | <i>Hiroaki SASAO</i> ...393 |
| 68 | Study on the Flux for Open Hearth Furnace. | <i>Hideomi MORITA, et ali.</i> ...396 |
| 69 | Oxidation of the Scrap in the Open Hearth Furnace. | <i>Hitoshi YOSHII, et ali.</i> ...399 |
| 70 | Study on the Carbon Deoxidation of Electrolytic Iron by High Frequency Vacuum Induction Furnace. (Melting of pure iron— I) | <i>Kanichi FUKUI, et ali.</i> ...401 |
| 71 | On the Development and Operation of the Plasma Jet Furnace. (Development of the plasma jet furnace— I) | <i>Teruo TOKUI, et ali.</i> ...404 |
| 72 | On the Steel Qualities of SUJ2 Remelted by Plasma Jet Furnace. (Development of the plasma jet Furnace— II)..... | <i>Kōsi KALŌ, et ali.</i> ...407 |
| 73 | On Dolomite Bottom in Large Electric Arc Furnace. | <i>Atsuo MORIYA, et ali.</i> ...410 |
| 74 | The Failure Velocity by Structural Spalling on Refractories. (Study on the failure velocity of iron and steel plant refractories— I) | <i>Yasujirō KOYAMA, et ali.</i> ...412 |
| 75 | Effect of Slag Components to Corrosion of Magnesia Clinker. | <i>Takuo YAGI, et ali.</i> ...415 |
| 76 | The Effect of Primary Holding Time on the Internal Defects of Aluminum Killed Low-Carbon Steel. | <i>Hideo SUZUKI, et ali.</i> ...418 |
| 77 | Mode of Liquid Metal Flow during Ingot Solidification of Killed Steel. (Tracer application of RI to steel works—VII) | <i>Kiyohito TANIZAWA, et ali.</i> ...419 |
| 78 | Segregation in Some Experimentally Solidified Killed Steel Ingots. | <i>Masazumi HIRAI, et ali.</i> ...423 |
| 79 | Some Experiments to the Solidification of Killed Steels. | <i>Kinya INAMOTO, et ali.</i> ...425 |
| 80 | Relations between Solidifying Condition and Internal Quality of 3-ton Sand Steel Ingot. (Studies on relations between mechanism of inverse segregation and formation | |

| | | |
|-----|--|---|
| | of oxide inclusions in large steel ingots— I) | Akitsugu MOMOSE, <i>et ali.</i> ...428 |
| 81 | On Condition of Solute Concentration in 3-ton Sand Steel Ingot during Solidification Process. (Studies on relations between mechanism of formation of inverse segregation and formation of oxide inclusions in large steel ingots— I) | Akitsugu MOMOSE, <i>et ali.</i> ...431 |
| 82 | On Results of Temperature Measurement in 3-ton Sand Steel Ingot during Solidification Process. (Studies on relations between mechanism of formation of inverse segregation and formation of oxide inclusions in large steel ingots— III) | Akitsugu MOMOSE, <i>et ali.</i> ...434 |
| 83 | Model Experiment on Floating of Concentrated Molten Steel. | Akitsugu MOMOSE, <i>et ali.</i> ...436 |
| 84 | Mechanism of Formation of V-Segregation. (Study on the solidification and segregation of large steel ingot for forging— V) | Michio HAGA, <i>et ali.</i> ...438 |
| 85 | Study on Mixing of Ferroalloys in ladle. | Tadao TOMINAGA, <i>et ali.</i> ...440 |
| 86 | Tapdegassing Process..... | Masaru FUKUMOTO, <i>et ali.</i> ...443 |
| 87 | On the DH Vacuum Degassing Process and Its Effect..... | Ryūzō KATŌ, <i>et ali.</i> ...446 |
| 88 | Effect of Vacuum Treating Conditions of DH Process on Degassing Reaction. | Takami IKEDA, <i>et ali.</i> ...448 |
| 89 | Application of DH Vacuum Degassing to the 1%C, 1 ¹ / ₂ % Cr Bearing Steel at the Yawata Iron & Steel Works..... | Kamematsu MATSUDA, <i>et ali.</i> ...451 |
| 90 | On the Accelerated Solidification by the Pressure. (Study on the method of sound ingot making by means of accelerated solidification— I) | Dr. Yoshitaka NAKAGAWA, <i>et ali.</i> ...454 |
| 91 | Results of Applying the Test of the Accelerated Solidification to Commercial Ingots. (Study on the method of sound ingot making by means of accelerated solidification— II) | Dr. Yoshitaka NAKAGAWA, <i>et ali.</i> ...457 |
| 92 | Preliminary Experiments on the Solidifying Rate and Formation of Sulfide Inclusions in Resulfurized Steels. (Studies on the solidification process and structure of steel ingot— II) | Haruhiko HIRAI, <i>et ali.</i> ...459 |
| 93 | On the Distribution of Blowholes in the Medium-Carbon Rimmed Steel Ingots. | Hideo ITOH, <i>et ali.</i> ...463 |
| 94 | Continuous Casting of Bearing Steel. (Study on continuous casting standards of bearing steel— I) | Kiyokazu SASAKI, <i>et ali.</i> ...466 |
| 95 | Corrosive Resistance Test of Refractories for Tundish Nozzle Used in the Continuous Casting of Steel. (Study on the continuous casting of steel— V) | Takeshi SUZUKI, <i>et ali.</i> ...469 |
| 96 | On the Quality of Hard Steel Wire Rods from Billet by LD Converter and Continuous Casting Process. (On the quality of steel from continuously cast billet— I) | Akira KIMURA, <i>et ali.</i> ...471 |
| 97 | On the Quality of Spring Steel from Continuously Cast Billet. (On the quality of steel from continuously cast billet— II) | Dr. Shinkichi KOIKE. ...473 |
| 98 | An Evaluation of Exothermic Hot Tops. | Masahiro FUKUDA, <i>et ali.</i> ...476 |
| 99 | Relation between the Physical Properties and the Thermal Shock on the Stopper Head. | Osamu HIRAIWA, <i>et ali.</i> ...478 |
| 100 | On the Chemical Reaction between Molten AISI 321 Steel and Refractories. (Fundamental study on refractory for ingot making— I) | Akitsu TOMITA, <i>et ali.</i> ...482 |
| 101 | Application of Spheroidal Graphite Cast Iron. | Yasuteru YAMADA, <i>et ali.</i> ...485 |
| 102 | Mechanism of Dephosphorization Reaction in Molten Iron. | Fumiyoshi MIURA, <i>et ali.</i> ...521 |
| 103 | The Solubility of Hydrogen in Fe-Al, Fe-Cr, Fe-Mo, Fe-S Alloys. | Shigeyoshi FUKUDA, <i>et ali.</i> ...523 |

| | | |
|-----|---|---|
| 104 | Model Studies of Slag-Metal Reactions by Pb-Cd Alloy-Salt Systems. | Yūichi ŌNO, <i>et al.</i> ...526 |
| 105 | Effects of Crucibles Materials on the Rate of Deoxidation. (Kinetic research on deoxidation of steel—V) | Takaho KAWAWA, <i>et al.</i> ...528 |
| 106 | On the Rate of Deoxidation with Silicon in Tranquil Steel Bath. (Kinetic research on deoxidation of steel—VI) | Takaho KAWAWA, <i>et al.</i> ...531 |
| 107 | Influence of Dedoxidation Formula on the Properties of High Carbon Steel Wire Rod..... | Kazuo OKAMOTO. ...534 |
| 108 | Mass-Transfer from the Surface of Rotating Steel Cylinder into Liquid Al or Zn. (Mass-transfer in liquid metals— I) | Mineo KOSAKA, <i>et al.</i> ...536 |
| 109 | Mass-Transfer from the Surface of Stating Steel Cylinder into Liquid Al or Zn. (Mass-transfer in liquid metals— II) | Mineo KOSAKA, <i>et al.</i> ...539 |
| 110 | The Influence of Oxides (FeO·Cr ₂ O ₃ and Cr ₂ O ₃) Addition to the Melt on the Distorted Iron Chromite. (Fundamental studies on the non-metallic inclusions in steels of Fe-Cr-O system—VII) | Nobuya IWAMOTO, <i>et al.</i> ...542 |
| 111 | The Influence of Oxygen Potential on the Distorted Iron Chromite. (Fundamental studies on the non-metallic inclusions in steels of Fe-Cr-O system—VIII) | Nobuya IWAMOTO, <i>et al.</i> ...544 |
| 112 | On the Rising Velocity of Deoxidation Products in Static Iron Bath. (Study of deoxidation— I)..... | Saburo KOBAYASHI, <i>et al.</i> ...546 |
| 113 | On the Rising Velocity of Al ₂ O ₃ Particles in Static Iron Bath. (Study of deoxidation— II) | Saburo KOBAYASHI, <i>et al.</i> ...549 |
| 114 | On the Rise of Deoxidation Products in the Process of Silicon Deoxidation. (Study on the rise of deoxidation products— I) | Katsuhiko NISHIKAWA, <i>et al.</i> ...552 |
| 115 | Nonmetallic Inclusions in Fe-Si-Mn-O System. (Study of deoxidation products— III) | Yutaka NAGANO, <i>et al.</i> ...554 |
| 116 | On the Mechanism of Formation of Oxide Inclusions at the Addition of Deoxydizer. | Yasushi KOJIMA, <i>et al.</i> ...557 |
| 117 | Influence of Steelmaking Factors on the Parameter B of Sand Seam Distribution Function. (Studies on sand seam in low carbon killed steel— V) | Akira MASUI, <i>et al.</i> ...560 |
| 118 | Influence of Steelmaking Factors on the Parameter A of Sand Seam Distribution Function. (Studies on sand seam in low carbon killed steel— VI) | Akira MASUI, <i>et al.</i> ...563 |
| 119 | Steel Making Factors on the Sand Seams Grade of Bearing Steel. | Kazuo ISHIHARA, <i>et al.</i> ...566 |
| 120 | Study on the Large Inclusions in Rimming Steel. | Haruo SHIMADA, <i>et al.</i> ...568 |
| 121 | Analysis of Non-Metallic Inclusions by Electron Probe Microanalyser. | Mizuo TAJIMA, <i>et al.</i> ...571 |
| 122 | Some Consideration on Extraction of Oxide Inclusions in Steel by Klinger & Koch Method. | Hiroshi NAGAYAMA, <i>et al.</i> ...574 |
| 123 | On the Electrolytic Method of Extracting Non-Metallic Inclusions in 18-8 Stainless Steel. (A study of non-metallic inclusions in 18-8 stainless steel— II)..... | Hikoya IWAI, <i>et al.</i> ...577 |
| 124 | Electrical Conductivity Measurement of Molten CaO-SiO ₂ -Al ₂ O ₃ System. (Research on the molten slag refyning— IV) | Makoto KATŌ, <i>et al.</i> ...580 |
| 125 | Effect of FeO, MgO or MnO on the Viscosity of Molten CaO(43)-SiO ₂ (43)-Al ₂ O ₃ (14) Slag. (Research on the molten slag refyning— V) | Makoto KATŌ, <i>et al.</i> ...582 |
| 126 | Effect of V ₂ O ₅ , Cr ₂ O ₃ , P ₂ O ₅ or TiO ₂ on the Viscosity of Molten CaO(43)-SiO ₂ (43)-Al ₂ O ₃ (14) Slag. (Research on the molten slag refyning— VI) | Makoto KATŌ, <i>et al.</i> ...584 |
| 127 | Effect of NaF, CaF ₂ , MgF ₂ or AlF ₃ on the Viscosity of Molten CaO(43)-SiO ₂ (43)-Al ₂ O ₃ (14) Slag. (Research on the molten slag refyning— VII) | Makoto KATŌ, <i>et al.</i> ...586 |

| | |
|-----|---|
| 128 | The Effects of Mn, Si on the Mechanical Properties and Cold Formabilities of Hot Rolled Steel Sheets. (High strength steel sheet for cold forming quality—Ⅲ), <i>Masaji HASEGAWA, et ali.</i> ...589 |
| 129 | The Effects of Al, Cr on the Mechanical Properties and Cold Formabilities of Hot Rolled Steel Sheets. (High strength steel sheet for cold forming quality—Ⅳ), <i>Masaji HASEGAWA, et ali.</i> ...591 |
| 130 | On the Properties of Heavy-Section Mn-Mo-Ni Steel Plate for Nuclear Pressure Vessel. (On the properties of heavy-section steel for nuclear pressure vessel—Ⅰ), <i>Kunio YAMADA, et ali.</i> ...594 |
| 131 | Application of Low-Mn Steel to High Strength Steel Bar. <i>Hiroshi IMAMURA, et ali.</i> ...596 |
| 132 | On the Continuous Cooling Transformation Curves and the Potentiostatic Polarization Curves. (Study of the standard steel contained zirconium—Ⅱ), <i>Dr. Haruhiko FUJITA, et ali.</i> ...599 |
| 133 | On the Characteristics of WEL-TEN 60H Steel after Hot Working. <i>Suehiro HIYOSHI, et ali.</i> ...602 |
| 134 | The Relation of Chemical Composition to the Strength of Weldable High Strength Steels in the Quenched and Tempered Condition..... <i>Takayasu OKADA, et ali.</i> ...604 |
| 135 | Quenched and Tempered Typed High Strength Steels. (On the factors which affect mechanical properties of low alloy steels—Ⅰ), <i>Junichi TANAKA, et ali.</i> ...607 |
| 136 | Aging Behaviour of 5Ni-2Al Age Hardening Steels..... <i>Masao KANAO, et ali.</i> ...610 |
| 137 | Investigation of Cause of Failure on the Used Till Recuperater Tube at the Soaking Pit. <i>Osamu HIRAIWA, et ali.</i> ...613 |
| 138 | Metal Flow in the Slab Rolling Process. (Application of RI trace to the study of plastic deformation of steel—Ⅰ), <i>Etuo NOMURA, et ali.</i> ...616 |
| 139 | On the Roll Crown of Plate Mill 2Hi Rougher. <i>Shigenari SHIMIZU, et ali.</i> ...619 |
| 140 | On the Hot Formability of Low Carbon-Steel Thick Plates. <i>Fujio MOROZUMI, et ali.</i> ...621 |
| 141 | Effect of Tramp Elements on the Hot Workability of Low Carbon Steels. <i>Chūji KAWAI, et ali.</i> ...624 |
| 142 | Macroscopic Defects in Heavy Plate of Killed Steel. <i>Masaru FUKUMOTO, et ali.</i> ...626 |
| 143 | Step Extruding of Continuously Cast 18Cr-8Ni Steels..... <i>Kazuo OKAMOTO</i> ...629 |
| 144 | On Heat Transfer of Spray Cooling in Unsteady State. (Study on cooling of steel—Ⅰ), <i>Masashi MITSUZUKA, et ali.</i> ...631 |
| 145 | On the Surface Seams Caused by Non-Metallic Inclusions in Cold Rolled Sheet of 18-8 Stainless Steel..... <i>Kōsi KATO, et ali.</i> ...633 |
| 146 | On the Hardness and Ferrite Grain Size of Steel Tubes after Cold Working and Heat Treatment. (Studies on the cold working of steel tubes—Ⅱ), <i>Teruo TAMURA, et ali.</i> ...637 |
| 147 | Residual Stress on the Thermally Shocked Surface of the Forged Hardened Steel Roll. (Observation on damaged zones of the roll surface and thermal shock test—Ⅱ), <i>Hirosuke TABE, et ali.</i> ...639 |
| 148 | On the Shape Improvement of Thin Steel Strip by Means of a Tension Leveller. <i>Tadao HIRASAWA, et ali.</i> ...641 |
| 149 | Some Microscopic Observations of Dislocations in Heat-Treated Steels under Tension. (A study of fatigue properties in steels—Ⅲ), <i>Dr. Syōichi NAKANISHI, et ali.</i> ...644 |
| 150 | Effect of Alloying Elements on the Rimmed Steel. <i>Arihiko MORITA, et ali</i> ...646 |
| 151 | The Effect of Austenite Grain Size on the Fatigue Strength of Steel. <i>Kazuichi TSUBOTA, et ali.</i> ...648 |
| 152 | FeO Inclusions and Fatigue of Steel. (Fundamental research on relationship between fatigue properties of steel and inclusions—Ⅰ), <i>Masae SUMITA, et ali.</i> ...651 |
| 153 | The Change of Impact Characteristics under the Repeating Load. <i>Toshiaki HAZE, et ali.</i> ...654 |
| 154 | Controlling of the Film Thickness of PVC Coated Steel Sheet. <i>Tadashi NEMOTO, et ali.</i> ...656 |
| 155 | Trial Production of Automatic Surface Defect Testing Machine. <i>Yukihiko KATŌ, et ali.</i> ...658 |

- 156 The Effect of the Water and Solid Materials in the Steam on Corrosion.
(Corrosion of main materials in geothermal steam— I) *Matsuo MIYAZAKI, et ali.* ...660
- 157 Evaluation of Pitting Resistance of Stainless Steel by Potentiostat.
(Study of pitting corrosion on stainless steel— III) *Yutaka ADACHI* ...663
- 158 Residual Stresses in the Surface Zone of Partially Heated Cylindrical Specimens. (Study on the working rolls of cold strip mills— VI) *Kiyozō SAKABE, et ali.* ...667
- 159 On the Tempering Behavior of 3Cr-1.5Mo, 3Cr-1.5Mo-0.3V, and 8Cr-1Mo-1.5V Steels.
(Study on hot-working tool steel— VIII) *Yoshiyuki SHINYAMA, et ali.* ...670
- 160 On the Stepped Quenching of 5%Cr Hot Work Die Steel. *Satoshi WATANABE, et ali.* ...672
- 161 Effect of Alloying Elements on the Corrosion Resistance of Die Cast Tool Steels in Molten Aluminium. *Kousuke MURAI, et ali.* ...675
- 162 Characteristics of High Speed Steels under Bending and Torsional Stresses.
(Study on the toughness of tool steels— I) *Takeshi ITŌ, et ali.* ...677
- 163 Effect of Carbide Grain Size on the Mechanical Properties and the Cutting Ability of High Speed Steel. *Tatsuo MASUDA, et ali.* ...680
- 164 Study on Comparison of Properties between Hot Extruded Bar and Forged One of High Speed Steel. *Mitsutoshi AGUNE, et ali.* ...683
- 165 Effect of Cooling Rates from Austenitizing Temperature on High Temperature Strength of a 1%Cr-1%Mo-1/4%V Steel for Steam Turbine Shaft Forgings. *Yūkō KUMADA, et ali.* ...687
- 166 Effect of Cooling Rates in Quenching after Austenitizing on the Mechanical Properties of 12% Chromium Steel. *Ei KANAZAWA, et ali.* ...689
- 167 Effect of Bi and B on High Temperature Strength of 15Cr-15Ni and 17Cr-14Ni Type Austenitic Steels.
(Study on austenitic heat resisting steels— I) *Yutaka FUKUI, et ali.* ...691
- 168 Study of 14Cr-16Ni Heat Resisting Steel. *Noboru TAKAHASHI, et ali.* ...693
- 169 Effect of Be and Te on High Temperature Properties of 17Cr-11Ni-2Mo Steel.
(Study on austenitic heat resisting steels— III) *Humio HATAYA, et ali.* ...697
- 170 The Effect of C, Ti, Nb on High Temperature Properties of 18Cr-12Ni-3Mo Austenitic Heat Resisting Steel Containing Boron. (Studies on austenitic heat resisting steel— VI) *Yoshikuni KAWABE, et ali.* ...699
- 171 The Effect of Heat Treatment on High Temperature Properties and Structure of 18Cr-12Ni Austenitic Heat Resisting Steel Containing Boron. (Studies on austenitic heat resisting steel— VII) *Yoshikuni KAWABE, et ali.* ...702
- 172 High Temperature Properties of High Manganese Heat Resisting Steel, 10M6NB Alloy. *Heitarō YOSHIDA, et ali.* ...704
- 173 On the High Manganese Type Steels for Exhaust Valve.
(Study on valve steel— II) *Kanō KIKUCHI, et ali.* ...707
- 174 Creep Rupture Strength of Austenitic Steels for Boiler Tube. *Akira NAGAO, et ali.* ...710
- 175 Effect of Ti on the Properties of High Cr-Si-Al Heat Resisting Steels.
(Study on the Cr-Si-Al heat resisting steels— III) *Kiyoshi FUJIWARA, et ali.* ...713
- 176 Embrittlement of Pure Iron at Room Temperature.
(Study of pure iron— VIII) *Toshikatsu ŌTANI, et ali.* ...716
- 177 Effect of Chemical Composition and Its Heat Treatment on the Ductility. (Study on ductilities in large steel forgings— I) *Toyohisa ODA, et ali.* ...719
- 178 Increased Strength and Toughness of Mild Steel due to High-Temperature Quenching. *Dr. Tadayoshi TAKAHASHI, et ali.* ...721

- 179 Effect of Strain Aging on Mechanical Properties
in Low Carbon Martensitic Steels.....*Toshiyuki WATANABE, et ali.* ...724
- 180 The Effects of Annealing Temperature on Strain Aging
of Vanadium-Treated Low Carbon Rimmed Steel Sheets.*Shinzō HARADA, et ali.* ...726
- 181 Effect of Ni and Cr on Heat-Treatment Characteristics
of High Carbon Steel. (Studies on effects of metallic
impurities on properties of steel—V)*Shirō YOSHIMATSU, et ali.* ...729
- 182 On the Properties of ASME, SA336 Steel Ring Forging.
(On the properties of heavy-section steel for
nuclear pressure vessel—II)*Kunio YAMADA, et ali.* ...732
- 183 Study on Properties of Rails Made of Pure-Oxygen Converter Steel.*Kenji AOI, et ali.* ...735
- 184 Relation between the Heat-Treatment and Hardness, Tensile,
Torsion Test at Room and High Temperatures of the
Spring Materials Made of 5% Cr-Mo-V Steels and
9% W-Cr-V Steels. (Study on the Spring materials—VI)*Dr. Hideji HOTTA.* ...737
- 185 Effects of Grain Sizes and Strain Rate on Tensile Properties
of Quenched and Tempered Mild Steels at Low Temperatures.
(Measurement of tensile properties of steels with a high
speed impact tension testing machine—X)*Akinori MATSUDA, et ali.* ...739
- 186 Study on the Inclusion Behaviors of Simultaneously Used
Freecutting Additives to Low Carbon Steel and Their
Effectiveness on Machinability.
(Study on machinability and minor alloy
elements steel—VII)*Dr. Tōru ARAKI, et ali.* ...741
- 187 On the Qualities of the Extruded Bearing Steel
Tubes from Continuously Cast Blooms.*Saburō SHIKŌ, et ali.* ...745
- 188 Effect of Non-Metallic Inclusion and Micro Structure
on the Fatigue Life of Bearing Steel.*Akira YAMAGUCHI, et ali.* ...747
- 189 Study on Air-Oxidation of Molten Steel Containing 17% Cr.*Hidemaro TAKEUCHI, et ali.* ...750
- 190 On Surface Tension Measurement of Slag from Arc
Welding Electrode by Drop Weight Method.*Hisashi KAHATA, et ali.* ...752
- 191 On Applicability of the Stationary Liquid and Supports
Which Were Reported in Literature to Metallurgical Field.
(Application of the gaschromatography to the determination
of a minute amount of NH_3 in gaseous atmosphere—I)
..... *Dr. Taketomo YAMAZAKI, et ali.* ...755
- 192 On a Trial Assembly of the Detector Cell and Column Made
of Glass for Precise Measurement of NH_3 .
(Application of the gaschromatography to the determination
of a minute amount of NH_3 in gaseous atmosphere—II)*Katsuhiko YABE, et ali.* ...758
- 193 On Continuous and Automatic Analysis of All Constituents
of B.F.G. by Gas Chromatography.....*Sōichi KIBA, et ali.* ...761
- 194 On Continuous Analysis of Blast Furnace Top Gas
by Infra-Red Gas-Analyser.....*Yoshikazu KUWANO, et ali.* ...764
- 195 On the Microstructure and Emission of Steel Sample.
(Studies on the quantovac analysis—III).....*Kiyoyuki TANAKA, et ali.* ...767
- 196 On the Effect of Co-Existent Elements in Emission
Spectrochemical Analysis of High Speed Steel. (Study on
emission spectrochemical analysis of iron and steel—III)*Humio SAWAI, et ali.* ...769
- 197 The Sampling Method for the Rapid Analysis of
Oxygen and Hydrogen in Molten Steel.*Masataka KAMAKURA, et ali.* ...772
- 198 The Rapid Analysis of Oxygen in Special Steels by the Argon
Carrier Coulometric Counting Method.*Masataka KAMAKURA, et ali.* ...775
- 199 The Determination of Impurities in Tin-Ingots for
Template by A.C. Polavographic Method.*Shigeo NAGAMURA, et ali.* ...778

| | | | |
|-----|---|---------------------------------|--------|
| 200 | Spectrophotometric Determination of Nickel in Iron and Steel. | <i>Dr. Shigeo WAKAMATSU.</i> | ...780 |
| 201 | Spectrophotometric Methods for Analysis of Impurities in Waste Acid of Sulphuric Acid Pickle Liquor..... | <i>Hirahisa KAWASE, et ali.</i> | ...783 |

Contents of Panel Discussion

Chairman *Kōji SANBONGI*

| | | | |
|--------------|--|--|--------|
| PD. 1 | Relation between Strength of Sinter and Its Microstructure during Reduction. | <i>Dr. Shojiro WATANABE, et ali.</i> | ...488 |
| PD. 2 | On Degradation of Sinter during Chemical Reduction in Low Temperature Range. | <i>Haruo ADACHI.</i> | ...491 |
| PD. 3 | Size Degradation of Sinter during Reduction. | <i>Dr. Kenjiro KANBARA, et ali.</i> | ...495 |
| PD. 4 | Influence of Chemical Composition upon the Degradation of Sinter in the Course of Reduction. | <i>Dr. Koretaka KODAMA, et ali.</i> | ...498 |
| PD. 5 | Mechanism of Degradation of Sinter in the Course of Reduction. | <i>Dr. Akitoshi ISHIMITSU, et ali.</i> | ...501 |

Chairman *Kōkichi SANO*

| | | | |
|---------------|--|------------------------------------|--------|
| PD. 6 | On the Oxidation Mechanism in LD Converter. | <i>Dr. Kichizō NIWA, et ali.</i> | ...505 |
| PD. 7 | Studies on the Refining Reactions in Basic Oxygen Converter..... | <i>Dr. Kazumi MORI, et ali.</i> | ...507 |
| PD. 8 | Analysis of Oxidizing Reaction in an Oxygen Top Blowing Converter. | <i>Dr. Takehiko FUJII, et ali.</i> | ...510 |
| PD. 9 | On the Mechanism of the Blowing Reaction in Basic Oxygen Process. | <i>Kiminari KAWAKAMI.</i> | ...513 |
| PD. 10 | Decarburization Reaction and Oxidation of Bath in LD-Steelmaking..... | <i>Jun-ichi MATSUNO, et ali.</i> | ...516 |

Chairman *Yūnoshin IMAI*

| | | | |
|---------------|---|-----------------------------------|--------|
| PD. 11 | Studies of the Deoxydation Behaviors of Metallic Niobium..... | <i>Nabuya IWAMOTO, et ali.</i> | ...786 |
| PD. 12 | Physical Chemistry on Steels Containing Vanadium, Niobium and Tantalum. | <i>Dr. Kiichi NARITA, et ali.</i> | ...788 |
| PD. 13 | Precipitation Hardening of Niobium Treated High Tensile Strength Steel. | <i>Akira NAKASHIMA, et ali.</i> | ...792 |
| PD. 14 | The Strengthening Mechanism of Small Niobium Additions on the Basis of Microstructures. | <i>Mitsuru TANINO.</i> | ...794 |
| PD. 15 | Prevention of Softening by Reheating in As-Rolled Steel Containing Small Amount of Niobium | <i>Isao KIMURA, et ali.</i> | ...797 |

Chairman *Masayoshi HASEGAWA*

| | | | |
|---------------|---|--------------------------------|--------|
| PD. 16 | Influence of Non-Metallic Inclusions on Formability of Semikilled Steel Sheets. | <i>Shirō INOUE, et ali.</i> | ...800 |
| PD. 17 | Effects of Nonmetallic Inclusions in Thin Steel Sheet upon Its Formability. | <i>Dr. Shinichi NAGASHIMA.</i> | ...802 |

| | | |
|---------------|---|---|
| PD. 18 | Relation Ship between Nonmetallic Inclusions in Steel and Tensile Properties in Thickness Direction. | <i>Mizuo SAKAKIBARA, et ali.</i> ...805 |
| PD. 19 | Effect of Artificial Inclusions upon Mechanical Properties of Steel. | <i>Mahito KOIZUMI, et ali.</i> ...807 |
| PD. 20 | Effects of Nonmetallic Inclusions on the Mechanical Properties of Electric Resistance Welded Steel Tubes. | <i>Naohiko MIZUNO.</i> ...810 |
| PD. 21 | Relation between Metal Flow and Bending Fatigue Strength. | <i>Dr. Kunio NISHIOKA.</i> ...813 |