装入物の軟化溶融過程から見た加湿送風の高炉操業への影響〔論文〕国分春生・佐々木晃・田口整司・槌谷暢男高炉内でのアルカリ,亜鉛の挙動と操業への影響〔論文〕……田口整司・小坂橋寿光・槌谷暢男・高橋洋光高炉炉内滴下帯形状の推定と検証〔論文〕……小林、勲・清水正賢・稲葉晋一・成田貴一低燃料比操業時の高炉内諸現象〔論文〕……相川脩二・山本亮二・中島龍一・岸本純幸・福島、勤高炉非定常モデルによる火入れ操業の検討〔論文〕……羽田野道春・栗田興一・山岡秀行・横井、毅高炉数式モデルによる滅尺吹き卸し操業の検討〔論文〕……羽田野道春・栗田興一・山岡秀行・横井、毅高炉数式モデルによる滅尺吹き卸し操業の検討〔論文〕……羽田野道春・栗田興一・山岡秀行・横井、毅然院試験炉における微粉炭燃焼実験〔論文〕……成田貴一・前川昌大・金山宏志・関、義和・斉藤武文大分第1高炉の微粉炭吹き込み操業〔技術報告〕……川辺正行・和栗真次郎・馬場昌喜・石川、泰・長谷川晟

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## Research Articles

Dry Granulation and Solidification of Molten Blast Furnace Slag

By Mayumi Yoshinaga, Roichi Fujii, Tatsuhiko Shigematsu and Tetsuro Nakata

Long Term Creep Rupture Properties and Microsturcture of 12% Cr Heat Resisting Steels By Ik-Min Park and Toshio Fujita

Fundamental Study of Size Degradation Mechanism of Agglomerates during Reduction By Ichiro Shigaki, Mineo Sawada, Masahiro Maekawa, and Kiichi Narita

Effect of Aging Condition of Tensile Properties of Iron-Nickel-Titanium Maraging Steels By Ko Soeno and Masatoshi Tsuchiya

Transformation Kinetics of Bainite during Isothermal Holding and Continuous Cooling By Minoru UMEMOTO, Kazunari Horiuchi, and Imao Tamura

Effect of Applied Stress on Temper Embrittlement of 21/4Cr-1Mo Steel

By Masahide Suzuki, Kiyoshi Fukaya, and Tatsuo Oku

Effect of Calcium Fluoride on Phosphorus Distribution between MgO

Saturated Slags of the System CaO-MgO-FeO<sub>X</sub>-SiO<sub>2</sub> and Liquid Iron

By Hideaki Suito and Ryō INOUE

Stress Intensity Factors of Brittle Crack during Propagation and on Arrest

By Yoshifumi NAKANO and Michio KATAYAMA

Two-dimensional Simulation on the Gas Flow and Heat Transfer in the Blast Furnace

By Jun-ichiro YAGI, Kanji TAKEDA, and Yasuo OMORI

Effect of Alloying Elements on Strengthening and Toughening of

Maraging Steel through  $\alpha' \rightleftharpoons \gamma$  Cyclic Heat Treatment

By Kozo Nakazawa, Yoshikuni Kawabe, and Seiichi Muneki

## Technical Feature

Integrated Quality Information System in Kakogawa Works, Kobe Steel, Ltd.

By Koji ITAKURA

## **Technical Report**

Effective Utilization of Water in Iron and Steel Industry

By Yoshiyuki SATO

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Preprints for the 103 rd ISIJ Meeting -Part IV (continued on from Vol. 22)

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