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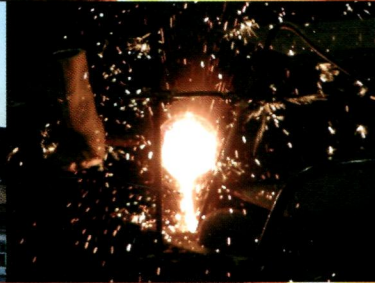
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2014

5th International Congress on the
Science and Technology of Steelmaking
Dresden, 1-3 October 2012
Germany



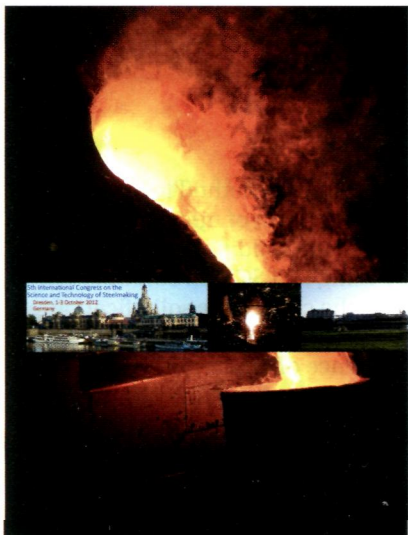
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This special issue of Steel Research International contains a selection of peer-reviewed manuscripts based on presentations at the 5th International Congress on the Science and Technology of Steelmaking. They cover different steps in the steelmaking technology as well as the basic research and its application in the industrial processes.
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Piotr R. Scheller

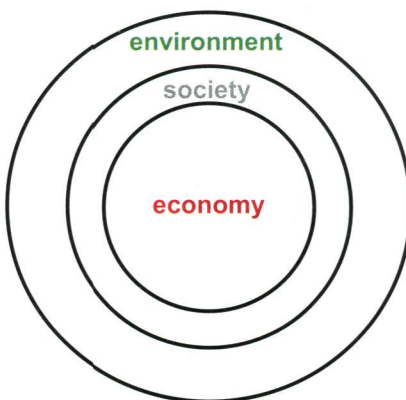
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Review

J.-P. L. Birat*

**Environmental Metallurgy:
Continuity or New Discipline?**

1240



The environment is considered as an externality in metallurgy as it is often in economics. However, because of the present massive interaction of the anthroposphere with the biosphere, this may not longer be a viable option. A new field, environmental metallurgy, is emerging.

Федеральное государственное
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Российской академии наук (ЦНБ УРО РАН)

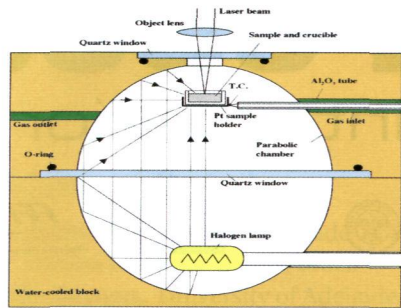
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Full Paper

S. Griesser,* M. Reid, R. Pierer, C. Bernhard, and R. Dippenaar

In Situ Quantification of Micro-Segregation that Occurs During the Solidification of Steel

1257



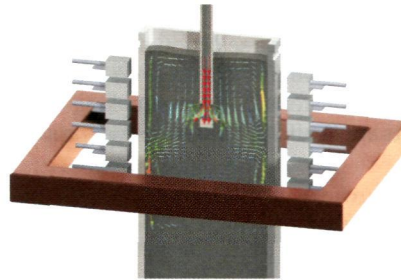
We present a method for the *in situ* quantification of micro-segregation during the solidification of steel by using HTLSCM in combination with the concentric solidification technique. Investigations of the influence of different alloying elements and cooling rates on the solidification behavior of steel are conducted and benchmarked against computational modeling results.

T. Wondrak,* S. Eckert, G. Gerbeth, F. Stefani, K. Timmel, A. J. Peyton, N. Terzija, and W. Yin

Visualization of the Flow in a Mold of Continuous Casting by Contactless Inductive Flow Tomography and Mutual Inductance Tomography

EDITOR'S CHOICE

1266



The contactless inductive flow tomography developed at the Helmholtz-Zentrum Dresden-Rossendorf is applied to a model of a continuous caster to measure the two-dimensional flow field in a slab caster mold. For Argon injection into the SEN transitions between double-roll and single-roll flows were observed.

T. Emi*

Optimizing Steelmaking System for Quality Steel Mass Production for Sustainable Future of Steel Industry

1274

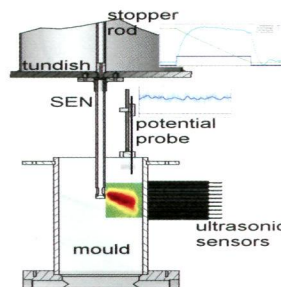


Recent innovative developments in steelmaking and casting have contributed greatly to the evolution of much stronger and tougher steel materials at reduced cost and improved productivity to support industry. Key technologies for and optimization of the developments are discussed with a perspective for further progress.

K. Timmel, T. Wondrak, M. Röder, F. Stefani, S. Eckert,* and G. Gerbeth

Use of Cold Liquid Metal Models for Investigations of the Fluid Flow in the Continuous Casting Process

1283



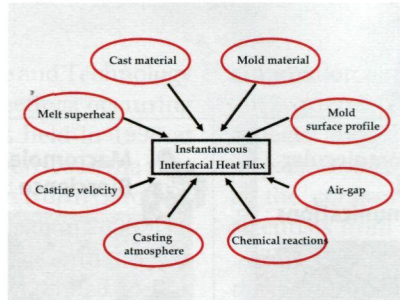
The paper presents two experimental facilities for modeling the continuous casting process of steel. The facilities operate with low melting point liquid metals. A selection of results from both experimental setups will be shown, e.g., regarding the effect of an electromagnetic brake on the flow in the mould.

Contents

R. I. L. Guthrie* and M. Isac

Horizontal Single Belt Casting of Aluminum and Steel

1291

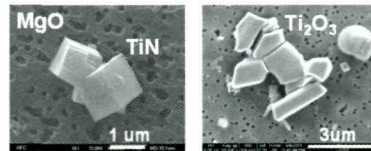


We present ab-initio predictions of instantaneous heat fluxes from liquid metals freezing on a cooling substrate. We note that instantaneous heat fluxes depend on the material properties of the two phases and an interfacial gas phase, on surface topography and possible interfacial chemical reactions. We consider these in the HSBC (Horizontal Belt Casting) Process for the production of AA6111 aluminum alloy sheet for automobiles.

J. S. Park and J. H. Park*

Effect of Mg–Ti Deoxidation on the Formation Behavior of Equiaxed Crystals During Rapid Solidification of Iron Alloys

1303

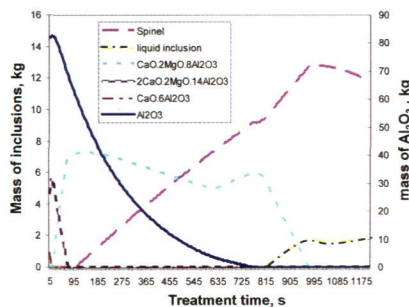


The effect of Mg–Ti deoxidation on the solidification structure of advanced high strength steel is investigated by observing the solidification structure and also the inclusion particles. Even with very low disregistry between delta iron and MgO (3.97%), the MgO itself does not work as an effective catalyst, indicating that there is another criterion for determining a good catalyst.

P. R. Scheller* and Q. Shu

Inclusion Development in Steel During Ladle Metallurgical Treatment - A Process Simulation Model - Part: Industrial Validation

1310



A comprehensive model for inclusion development in gas stirred ladles developed by the authors is validated in the industrial ladle treatment processes. It can be used for the process simulation and optimization. The important factors, like stirring intensity, reaction between steel and slag as well as refractory material, and the conditions needed for separation and floatation of non-metallic inclusions are taken into account.