

### LS 1 – Eisenerzeugung

Rohstoffe; Auf- und Vorbereitung; Reduktionsmittel; Verkokungs- und Brennstofftechnologie; metallurgische Grundlagen; Hochofen-, Direkt- und Schmelzreduktionsverfahren; Roheisen, Eisenschwamm; Nebenprodukte; Recycling; Anlagentechnik; Feuerfeststoffe; Messtechnik; Automatisierung; Simulation; Umwelt- und Arbeitsschutz

### LS 2 – Herstellung von Stahl und Legierungen

Einsatzstoffe; metallurgische Grundlagen; Konverter- und Elektroöfenverfahren; Sekundärmetallurgie; Umschmelzverfahren; Strang- und Blockgießen; Nebenprodukte; Recycling; Herstellung von Ferrolegierungen und Nicht-eisenmetallen; Pulvermetallurgie; Anlagentechnik; Feuerfeststoffe; Messtechnik; Automatisierung; Simulation; Umwelt- und Arbeitsschutz

### LS 3 – Umformtechnik, Wärme-/Oberflächenbehandlung, Trenn-/Fügetechnik

Grundlagen; Warm- und Kaltumformung; Walzen, Schmieden, Strang- und Fließpressen, Ziehen, Blechumformung; Wärmebehandlung; Oberflächentechnik; anorganische und organische Beschichtung; Korrosionsschutz; Trenn- und Fügetechnik; Anlagentechnik, Messtechnik, Automatisierung; Simulation; Umwelt- und Arbeitsschutz

### LS 4 - Werkstofftechnik, Anwendungstechnik

Metallphysik; Metallkunde; Metallografie; Eigenschaften von Eisen, Stählen, Nicht-eisenmetallen und Legierungen; Bruchmechanik, Betriebsfestigkeit; Anwendung von Stahl und anderen Werkstoffen in Automobil, Bauwesen, Energietechnik, Maschinen- und Anlagenbau; konkurrierende Werkstoffe

### LS 5 – Werkstoffprüfung, Werkstofffehler

Zerstörende und zerstörungsfreie Prüfverfahren; technologische Prüfungen; chemische und physikalische Analyseverfahren; Werkstofffehler; thermophysikalische Werkstoffsimulation

### LS 6 – Anlagentechnik, Werksinfrastruktur

Wärme- und Strömungstechnik; Beheizung, Brenner; metallurgische Öfen; Produktionsanlagen; Mess- und Regeltechnik; Automatisierung; allgemeine Werkseinrichtungen; Maschinentechnik; Elektrotechnik, Energietechnik und -wirtschaft; Transport und Lagerwesen; Planung und Neubau; Instandhaltung/-setzung; Qualitätswesen; Normung

### LS 7 – Modell- und Simulationstechnik

Physikalische Modellierung; mathematische Modellierung; Modellsimulation, Werkstoff- und Prozesssimulation; Software zur Anwendung in der Stahlindustrie

### LS 8 – Umwelt und Wirtschaft

Energieerzeugung und Energieversorgung; Umwelt- und Klimapolitik; Umwelt- und Klimaschutz; Umweltschonende Produktionstechnik; Recycling; Verwertung von Nebenprodukten; Umweltschutz durch Stahlanwendung; Arbeitsschutz; Betriebs- und Volkswirtschaft; Unternehmensführung; Software und Geschäftsanwendungen; Logistik und Verkehr; Recht, Soziales, Beruf, Bildung; Technikgeschichte

Informationsbereich Technik und Bibliothek  
Stahlinstitut VDEh  
Sohnstr. 65  
40237 Düsseldorf

Kontakt: Arkady Karafin  
Bestellung: Marina Lopez  
Petra Svenson

Tel: +49 (0) 211 67 07 461  
Mail: [arkady.karafin@vdeh.de](mailto:arkady.karafin@vdeh.de)  
Tel: +49 (0) 211 67 07 464  
Mail: [bibliothek@vdeh.de](mailto:bibliothek@vdeh.de)

## 2.1 Allgemeines

### Schlagwörter

**STAHLINDUSTRIE; PROZESSENTWICKLUNG; TECHNOLOGIE-REIFEGRAD; BEWERTUNGSMASSTAB**

### Titel deutsch

Ein TRL-Maßstab für die Eisen- und Stahlindustrie

### Titel original

**A Technology Readiness Level scale for iron and steel industries**

### Dokumentart

Zeitschriftenaufsatz

### Sprache(n)

Englisch

### Abstract

The Technology Readiness Level (TRL) scale is one of the most popular maturity assessment techniques used by industrial firms worldwide. However, it is not a panacea that will work for every firm or every industry in its original form. Consequently, for the scale to be truly useful, it has to be adapted to fit the unique features of different firms and industries. In this article, a revised and domain-specific TRL scale for evaluating technology maturity in iron and steel industries is proposed. This revised scale takes into account the idiosyncrasies of such firms, for example, product/process interdependencies, scaling problems, the reliance on pilot and demonstration experiments, and the fact that input and output materials are ingredients rather than components. The revised TRL scale helps managers to assess technology maturity and reduce risk by delivering better project and technology evaluations and providing a 'common language'. The study suggests several points for managers to note: 1) Production processes operate continuously 24/7, so new products or manufacturing process improvements must be proven to work without disturbances. This can often be achieved through experimental, pilot-scale and full-scale testing. 2) The revised scale reflects development activities that are specific to the process industry, such as experiment-, pilot- and full-scale testing. This allows managers to determine the precise technology readiness level of their project without having to repeatedly translate elements of the original NASA scale into their own context. 3) The revised scale separates the assessment of product and manufacturing process issues, while still acknowledging their interdependencies. This makes each level more concrete, and the scale more useful overall. 4) By using the adapted TRL scale, managers in iron and steel firms can gain access to a 'common language' to discuss and compare technologies internally. This is important, because it will smooth the evaluation and subsequent transfer of new technologies into the development of new products or processes. 5) For firms that have a separate process for technology development, it is important to choose the right time to move a new technology across to product or process development. Transferring too early may be too risky, while waiting too long may mean wasting resources and missing a market opportunity.

### Autor(en)

Klar, D.; Frishammar, Johan; Roman, V.; Hallberg, D.

### Institution(en)

Lulea University of Technology, SE; Vendemore, Solna, SE; LKAB, Lulea, SE

### Quelle

Ironmaking and Steelmaking

### Band/Jahrgang

43

### Erscheinungsjahr

2016

### Heft/Monat

7

### Seiten von-bis

S.494-499

### S/Bild/Tab/Qu

6S,2T,16Q

### Bezugsquelle

<http://dx.doi.org/10.1080/03019233.2015.1109024>

### Deskriptoren

EISEN- UND STAHLINDUSTRIE; BETRIEBSBEREITSCHAFT; REIFEGRAD; BEWERTUNGSMETHODE; PROZESSENTWICKLUNG; PRODUKTENTWICKLUNG; ENTWICKLUNGSSTAND; BVT (BESTE VERFÜGBARE TECHNIK); RISIKOANALYSE; TRL (Technology Readiness Level)

### Standort

VDEh P.5.1082

### DB-Objekt-Nr.

789724

(LS2 2016 22 1)

## 2.2 Einsatzstoffe, Vorbehandlung

<b>Schlagwörter</b>	<b>HOCHMANGANSTAHL; STAHLHERSTELLUNG; PROZESSENTWICKLUNG; MANGANERZKONZENTRAT-PELLETS</b>
<b>Titel deutsch</b>	Innovatives und kostengünstiges Konzept zur Herstellung von Mittel- und Hochmanganstählen
<b>Titel original</b>	<b>Innovative and economical approach for the production of mid- and high-manganese steel</b>
<b>Dokumentart</b>	CD-ROM (Teilauswertung); Tagungsbeitrag
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	<p>The ever-growing demand from the automotive sector for stronger, lighter and cheaper material demands the extensive commercialization of mid- to high-manganese 2nd and 3rd generation AHSS (Advanced High-Strength Steels). With the successful resolution of major technical difficulties in the continuous casting of these alloys, the conventional process of alloy addition is now the major obstacle limiting the commercial production of AHSS. Strict impurity level restrictions restricts the usage of traditional alloying agents such as high-carbon FeMn and SiMn, while alloying with high-purity material such as electrolytic manganese metal and low-carbon FeMn are prohibitively expensive for industrial-scale adoption. A novel process of producing mid- and high- manganese AHSS using pre-reduced micro-pellets containing partially reduced manganese oxide was introduced. A mixture of iron oxide, manganese ore, fluxes and carbon source are made into self-fluxes, self-reducing micro-pellets and undergoes pre-reduction. The hot, partially metallized, pre-reduced pellets can then be added to the LMF or directly injected into the EAF to produce mid-to-high manganese steels for further downstream processing. Mass balances were performed to obtain an optimized raw material composition for the pellets and to model the prereduction process. Thermodynamic simulations of the addition of the pellets to LMF have shown that the process is technically feasible and requires up to 30 kWh per tonne steel of less heat than the traditional process of FeMn addition. Further economic analyses have shown that the proposed process can achieve up to 78 USD per tonne of cost savings compared to the conventional method when producing a 6Mn-0.3C 3rd generation AHSS. The cost savings achievable for producing lower carbon grades of similar steel is slightly less but still significant, at around 58 USD and 42 USD per tonne for 0.25 and 0.20 wt-% carbon, respectively. In conclusion, the proposed process of pre-reduced pellet addition would be a technically feasible and highly economical competition to the existing conventional process of FeMn/SiMn/EEM addition.</p>
<b>Autor(en)</b>	Hernandez, V.; Mostaghel, S.; Ge, S.; Harris, C.; Cramer, M.
<b>Institution(en)</b>	Hatch, Mississauga, ON, CA
<b>Quelle</b>	AISTech 2016, Iron and Steel Technology Conference and Exhibition, AIST, Proceedings, Pittsburgh, PA, US, May 16-19, 2016
<b>Verlag</b>	Warrendale, PA, US: AIST ( <a href="http://www.aist.org">www.aist.org</a> )
<b>Band/Jahrgang</b>	2
<b>Erscheinungsjahr</b>	2016
<b>Papier-, Reportn.</b>	Datei: /AISTech2016-pdf-papers/20515.pdf
<b>Seiten von-bis</b>	775-786
<b>S/Bild/Tab/Qu</b>	12S,3B,4T,58Q,299kB
<b>Deskriptoren</b>	STAHLHERSTELLUNG; MANGANSTAHL; PROZESSENTWICKLUNG; ERZAUFBEREITUNG; ERZKONZENTRAT-PELLETS; SEKUNDÄRMETALLURGIE; MANGANERZ; THERMODYNAMISCHE ANALYSE; WIRTSCHAFTLICHKEITSUNTERSUCHUNG; TECHNISCH-ÖKONOMISCHE ANALYSE; AHSS (Advanced High-Strength Steel); Hochmanganstahl; Mittelmanganstahl; TWIP-Stahl (Twinning Induced Plasticity)
<b>Standort</b>	VDEh CDR 195(2016)
<b>DB-Objekt-Nr.</b>	789639 (LS2 2016 22 2)

## 2.3 Metallurgische Grundlagen

<b>Schlagwörter</b>	<b>(FE2O3-CR2O3-NIO)-SYSTEM; KARBOTHERMISCHE REDUKTION; ABFALLVERWERTUNG; REDUKTIONSMCHANISMUS</b>
<b>Titel deutsch</b>	Reduktionsmechanismus beim (Fe2O3-Cr2O3-NiO)-System durch Kohlenstoff
<b>Titel original</b>	<b>Reduction mechanism of Fe2O3-Cr2O3-NiO system by carbon</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	Isothermal experiments on the reduction of Fe2O3-Cr2O3-NiO (molar ratio of Fe-to-Cr-to-Ni is 3:2:2) by graphite were carried out at 1350- 1550 deg C, and effects of various factors on reduction degree were studied. The results show that the reaction rate of the Fe2O3-Cr2O3-NiO system is fast during the initial period (reduction degree, $a < 38\%$ ), and then the rate decreases until the end of the reduction. Factors such as temperature, carbon content, sample size have a more significant effect during the final stage ( $a > 38\%$ ). The metallic product formed at the initial stage (a Fe-Ni alloy) greatly promotes the reduction of Cr2O3 at the final stage. Further, during the reduction of Fe2O3-Cr2O3-NiO by carbon, interfacial reaction is the rate-controlling step and $g(a) = 1 - (1-a)(\exp 0.5)$ is the reaction mechanism for the initial stage, whereas two-dimensional diffusion is the rate-controlling step and $f(a) = a + (1-a)\ln(1-a)$ is the reaction mechanism for the final stage. The apparent activation energies are 55.43 kJ/mol and 174.54 kJ/mol for the initial and the final stages, respectively.
<b>Autor(en)</b>	Zhang, Yan-ling; Guo, Wen-ming; Liu, Yang; Jia, Xin-lei
<b>Institution(en)</b>	State Key Laboratory of Aadvanced Metallurgy, University of Science and Technology Beijing, CN
<b>Quelle</b>	Journal of Central South University of Technology - English Edition
<b>Band/Jahrgang</b>	23
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	6
<b>Seiten von-bis</b>	S.1318-1325
<b>S/Bild/Tab/Qu</b>	8S,10B,1T,20Q
<b>Bezugsquelle</b>	<a href="http://dx.doi.org/10.1007/s11771-016-3182-1">http://dx.doi.org/10.1007/s11771-016-3182-1</a>
<b>Deskriptoren</b>	STAHLHERSTELLUNG; ABFALLVERWERTUNG; EISENOXID; CHROMOXID; NICKELOXID; SEKUNDÄRROHSTOFF; STOFFGEMISCH; CARBOTHERMIE; METALLOTHERMISCHES VERFAHREN; KOHLENSTOFF; REDUKTIONSMITTEL; KINETIK; TEMPERATUR; REAKTIONSPRODUKT;
<b>Standort</b>	VDEh P.5.1259a
<b>DB-Objekt-Nr.</b>	789522 (LS2 2016 22 3)

## 2.3 Metallurgische Grundlagen

### Schlagwörter

**STAHLENTSCHWEFELUNG; BASISCHE SCHLACKE; SULFIDKAPAZITÄT; TONERDEEINFLUSS**

### Titel deutsch

Einfluss des Al<sub>2</sub>O<sub>3</sub>-Gehalts auf die metallurgischen Charakteristiken von Feinungsschlacke

### Titel original

**Effect of Al<sub>2</sub>O<sub>3</sub> content on metallurgical characteristics of refining slag**

### Dokumentart

Zeitschriftenaufsatz

### Sprache(n)

Englisch

### Abstract

The metallurgical effects of Al<sub>2</sub>O<sub>3</sub> in CaO-Al<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub>-MgO system slag on the desulfurization ability, inclusions and steel cleanliness were investigated using thermodynamic calculations, laboratory experiments and industrial tests. The results indicate that: with a decreasing Al<sub>2</sub>O<sub>3</sub> content in top slag and with the slag basicity remaining constant, the calculated  $a(\text{CaO})$  (activity of CaO),  $C_s$  (sulphide capacity) and  $\log(a(\text{MgO})/a(\text{Al}_2\text{O}_3))$  of the slag increase; the measured total oxygen content decreases, inclusion number and area decrease, and the average content ratio,  $X(\text{MgO})/X(\text{Al}_2\text{O}_3)$  of inclusions increases. Compared with the steel refined using conventional desulfurization slag N2 (B (basicity): 7.0, Al<sub>2</sub>O<sub>3</sub>: 30%), the steel refined using slag N1 (B: 4.5, Al<sub>2</sub>O<sub>3</sub>: 20%) gives a lower sulphur content, and the inclusions contain more MgO and less Al<sub>2</sub>O<sub>3</sub> and contain a certain amount of SiO<sub>2</sub>. The value of  $\log(a(\text{MgO})/a(\text{Al}_2\text{O}_3))$  decreases with the increase of Al<sub>2</sub>O<sub>3</sub> content and increases with the increase of the basicity of the slag. The slag with a basicity of 4.5 and 20% Al<sub>2</sub>O<sub>3</sub> has a higher value of  $\log(a(\text{MgO})/a(\text{Al}_2\text{O}_3))$  than the slag with a basicity of 7.0 and 30% Al<sub>2</sub>O<sub>3</sub>. Slag-metal equilibrium experiments show that, with a decreasing Al<sub>2</sub>O<sub>3</sub> content in top slag and with the slag basicity remaining constant, the total oxygen content decreases, the inclusion amount and area decrease, and the concentration ratio of the inclusion components,  $X(\text{MgO})/X(\text{Al}_2\text{O}_3)$ , increases. The Al<sub>2</sub>O<sub>3</sub> content has a great effect on the metallurgical characteristics of the refining slag. A decrease of Al<sub>2</sub>O<sub>3</sub> content in slag is beneficial for an increase in desulfurization ability, an increase of  $X(\text{MgO})/X(\text{Al}_2\text{O}_3)$  of inclusion, and a decrease of the total oxygen content and inclusion amount.

### Autor(en)

Yu, H.; Xu, J.; Zhang, J.; Wang, X.

### Institution(en)

University of Science and Technology Beijing, CN; Nanjing Iron and Steel, CN

### Quelle

Ironmaking and Steelmaking

### Band/Jahrgang

43

### Erscheinungsjahr

2016

### Heft/Monat

8

### Seiten von-bis

S.607-615

### S/Bild/Tab/Qu

9S,10B,4T,43Q

### Bezugsquelle

<http://dx.doi.org/10.1080/03019233.2016.1139858>

### Deskriptoren

STAHLENTSCHWEFELUNG; METALL-SCHLACKENREAKTION; ENTSCHEWELUNGSMITTEL; THERMODYNAMIK; THERMODYNAMISCHE AKTIVITÄT; THERMODYNAMISCHE ANALYSE; AKTIVITÄTSKOEFFIZIENT; VERTEILUNGSKOEFFIZIENT; ALUMINIUMOXID; BASISCHE SCHLACKE; OXIDEINSCHLUSS; NICHTMETALLISCHER EINSCHLUSS; REINHEITSGRAD; Sulfidkapazität

### Standort

VDEh P.5.1082

### DB-Objekt-Nr.

789519  
(LS2 2016 22 4)

## 2.3 Metallurgische Grundlagen

<b>Schlagwörter</b>	<b>STAHLHERSTELLUNG; GRENZFLÄCHENREAKTION; UNTERSUCHUNGSMETHODE</b>
<b>Titel deutsch</b>	Einige Aspekte von Grenzflächenphänomenen in der Stahlherstellung und -raffination
<b>Titel original</b>	<b>Some aspects of interfacial phenomena in steelmaking and refining</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	Unique experiments were designed to study the surface phenomena in steelmaking reactions. The concept of surface sulfide capacities and an understanding of the surface accumulation of surface-active species, based on experimental results, are presented. In order to understand the flow phenomenon at slag/metal interface, experiments were designed to measure the interfacial velocity of S on the surface of an iron drop immersed in an aluminosilicate slag using the X-ray sessile drop method. The oscillation of the iron drop in the slag due to the change in the surface concentration of sulfur at the slag-metal interface was monitored by X-ray imaging. From the observations, the interfacial velocity of sulfur was evaluated. Similar experiments were performed to measure the interfacial velocity of oxygen at the interface as well as the impact of oxygen potential on the interfacial velocity of sulfur. The interfacial shear viscosity and the dilatational modulus were also evaluated. In a study of the wetting of alumina base by iron drop at constant oxygen pressure under isothermal condition, the contact angle was found to be decreased with the progress of the reaction leading to the formation of hercynite as an intermediate layer creating non-wetting conditions. In the case of silica substrate, an intermediate liquid fayalite layer was formed.
<b>Autor(en)</b>	Wang, L.J.; Viswanathan, N.N.; Muhmood, L.; Kapilashrami, E.; Seetharaman, S.
<b>Institution(en)</b>	University of Science and Technology Beijing (USTB), CN; Lulea University of Technology, SE; Indian Institute of Technology (IIT) Bombay, Mumbai, IN; K.J. Somaiya College of Engineering, Mumbai, IN; SSAB, Oxelösund, SE; Royal Institute of Technology (KTH), Stockholm, SE
<b>Quelle</b>	Metallurgical and Materials Transactions B, Process Metallurgy and Materials Processing Science
<b>Band/Jahrgang</b>	47B
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	4
<b>Seiten von-bis</b>	S.2107-2113
<b>S/Bild/Tab/Qu</b>	7S,7B,2T,23Q
<b>Bezugsquelle</b>	<a href="http://dx.doi.org/10.1007/s11663-016-0631-z">http://dx.doi.org/10.1007/s11663-016-0631-z</a>
<b>Deskriptoren</b>	METALL-SCHLACKENREAKTION; GRENZFLÄCHENREAKTION; UNTERSUCHUNGSMETHODE; STAHLHERSTELLUNG; STAHLRAFFINIEREN; VISKOSITÄT; KONTAKTWINKEL; BENETZBARKEIT; Sulfidkapazität
<b>Standort</b>	VDEh P.5.497(Met.trans.B)
<b>DB-Objekt-Nr.</b>	789561 (LS2 2016 22 5)

## 2.3 Metallurgische Grundlagen

<b>Schlagwörter</b>	<b>UNTERKÜHLTE EISENSCHMELZE; OBERFLÄCHENSPANNUNG; SAUERSTOFFZUSATZ</b>
<b>Titel deutsch</b>	Oberflächenspannung unterkühlter schmelzflüssiger Fe-O Legierungen
<b>Titel original</b>	<b>Surface tension of super-cooled Fe-O liquid alloys</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	Generally, the effect of oxygen on surface tension is more considerable at a lower temperature, and thus the adsorption coefficient increases with decreasing temperature. With the conventional sessile drop method, however, the contact between the sample and the refractory material (substrate or crucible) cannot be avoided, and the measurement below the melting point (super-cooled region) is difficult. In this study, the surface tension of liquid Fe-O alloys was measured at temperatures ranging from 1621 K to 2006 K (1348 to 1733 deg C) under a He-Ar atmosphere by using the oscillating drop method with an electromagnetic levitation facility. The experimental results were compared with the calculated ones based on the ideal adsorption model and the two-step adsorption model. Since the calculation results based on the two-step adsorption model showed better agreements with the experimental data, it was concluded that there are interactions between the adsorbed oxygen on the surface of liquid iron, yielding non-ideal adsorption behavior. However, the interaction is not as strong as observed in the Fe-S system.
<b>Autor(en)</b>	Kim, Han Gyeol; Choe, Joongkil; Inoue, Takashi; Ozawa, Shumpei; Lee, Joonho
<b>Institution(en)</b>	Korea University, Seoul, KR; Chiba Institute of Technology, Narashino, JP
<b>Quelle</b>	Metallurgical and Materials Transactions B, Process Metallurgy and Materials Processing Science
<b>Band/Jahrgang</b>	47B
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	4
<b>Seiten von-bis</b>	S.2079-2081
<b>S/Bild/Tab/Qu</b>	3S,4B,22Q
<b>Bezugsquelle</b>	<a href="http://dx.doi.org/10.1007/s11663-016-0712-z">http://dx.doi.org/10.1007/s11663-016-0712-z</a>
<b>Deskriptoren</b>	EISENSCHMELZE; SAUERSTOFFZUSATZ; OBERFLÄCHENSPANNUNG; UNTERKÜHLUNG; SCHWEBESCHMELZEN; TEMPERATUREINFLUSS; KONZENTRATIONSEINFLUSS; MODELLSIMULATION; GASADSORPTION;
<b>Standort</b>	VDEh P.5.497(Met.trans.B)
<b>DB-Objekt-Nr.</b>	789558 (LS2 2016 22 6)

## 2.3 Metallurgische Grundlagen

<b>Schlagwörter</b>	<b>SCHAUMKERAMIKFILTER; INKOMPRESSIBLE STRÖMUNG; MODELLSIMULATION</b>
<b>Titel deutsch</b>	Analyse inkompressibler Strömungen durch Schaumkeramikfilter durch experimentelle Untersuchungen und mathematische Modellierung
<b>Titel original</b>	<b>Analysis on experimental investigation and mathematical modeling of incompressible flow through ceramic foam filters</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	<p>This paper presents experimental results of pressure drop measurements on 30, 50, and 80 pores per inch (PPI) commercial alumina ceramic foam filters (CFF) and compares the obtained pressure drop profiles to numerically modeled values. In addition, it is aimed at investigating the adequacy of the mathematical correlations used in the analytical and the computational fluid dynamics (CFD) simulations. It is shown that the widely used correlations for predicting pressure drop in porous media continuously under-predict the experimentally obtained pressure drop profiles. For analytical predictions, the negative deviations from the experimentally obtained pressure drop using the unmodified Ergun and Dietrich equations could be as high as 95 and 74 pct, respectively. For the CFD predictions, the deviation to experimental results is in the range of 84.3 to 88.5 pct depending on filter PPI. This is due to origin of equations used to predict the permeability constants, which were intended for packed beds not for ceramic foam filters. As a result, the use of the Brinkman-Forchheimer equation for foam filter CFD predictions may result in a significant underestimation of the pressure gradient. Better results can be achieved by applying the Forchheimer second-order drag term instead of the Brinkman-Forchheimer drag term. The final deviation of the CFD model estimates lie in the range of 0.3 to 5.5 pct compared to the measured values. Thus, it is suggested to use empirically fitted Forchheimer permeability constants, while running CFD simulations on ceramic foam filters. Lowest average CFD estimated to experimentally measured pressure gradient deviation (1.56 pct) was found, while using the Forchheimer drag term and for 50 PPI filters. The equivalent deviation for 30 and 80 PPI were 4.15 and 4.41 pct, respectively.</p>
<b>Autor(en)</b>	Akbarnejad, Shahin; Jonsson, Lage Tord Ingemar; Kennedy, Mark William; Aune, Ragnhild Elizabeth; Jönsson, Pär Göran
<b>Institution(en)</b>	Royal Institute of Technology (KTH), Stockholm, SE; Norwegian University of Science and Technology (NTNU), Trondheim, NO
<b>Quelle</b>	Metallurgical and Materials Transactions B, Process Metallurgy and Materials Processing Science
<b>Band/Jahrgang</b>	47B
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	4
<b>Seiten von-bis</b>	S.2229-2243
<b>S/Bild/Tab/Qu</b>	15S,14B,7T,59Q
<b>Bezugsquelle</b>	<a href="http://dx.doi.org/10.1007/s11663-016-0703-0">http://dx.doi.org/10.1007/s11663-016-0703-0</a>
<b>Deskriptoren</b>	KERAMISCHER FILTER; PORÖSE KERAMIK; PORÖSE KERAMIK; SCHAUMKERAMIK; INKOMPRESSIBLE FLÜSSIGKEITSSTRÖMUNG; STRÖMUNGSMUSTER; NUMERISCHE STRÖMUNGSSIMULATION; MODELLSIMULATION; MATHEMATISCHES MODELL; POROSITÄT; DRUCKVERLUST;
<b>Standort</b>	VDEh P.5.497(Met.trans.B)
<b>DB-Objekt-Nr.</b>	789572 (LS2 2016 22 7)



## 2.3 Metallurgische Grundlagen

<b>Schlagwörter</b>	<b>CALCIUMALUMOSILICATSCHMELZE; STRUKTURANALYSE; ALKALIMETALLZUSATZ; KERNRESONANZSPEKTROSKOPIE</b>
<b>Titel deutsch</b>	Untersuchung der strukturellen Rolle von Alkalikationen in Calciumalumosilicatgläsern mit Hilfe der 17O-Festkörper-Kernspinresonanzspektroskopie
<b>Titel original</b>	<b>Structural role of alkali cations in calcium aluminosilicate glasses as examined using oxygen-17 solid-state nuclear magnetic resonance spectroscopy</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	The structural roles of alkali and calcium cations are important for understanding the physical and chemical properties of aluminosilicate melts and glasses. The conventional view of alkali and alkaline-earth aluminosilicate glasses is that the structural roles of these cations are randomly distributed according to the chemical composition. Recently, oxygen-17 nuclear magnetic resonance (17O NMR) studies of calcium-sodium aluminosilicate glasses showed that these structural roles are not randomly given, but rather each cation has its own preferential role. However, the relationship between cation type and role preference in calcium aluminosilicate glass is not completely understood. In the present study, the structural roles of lithium, sodium, and potassium cations in selected calcium aluminosilicate glasses were investigated using 17O solid-state NMR experiments. Data from these experiments clearly show that potassium cations have a notably stronger tendency to act as charge compensators within the network structure, compared to sodium and lithium cations. The result of 17O NMR experiment also showed that sodium and lithium cations in part act as network modifier alongside with calcium cations.
<b>Autor(en)</b>	Sukenaga, Sohei; Kanehashi, Koji; Shibata, Hiroyuki; Saito, Noritaka; Nakashima, Kunihiko
<b>Institution(en)</b>	Tohoku University, Sendai, JP; Nippon Steel & Sumitomo Metal, Futtsu, JP; Kyushu University, Fukuoka, JP
<b>Quelle</b>	Metallurgical and Materials Transactions B, Process Metallurgy and Materials Processing Science
<b>Band/Jahrgang</b>	47B
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	4
<b>Seiten von-bis</b>	S.2177-2181
<b>S/Bild/Tab/Qu</b>	5S,3B,2T,35Q
<b>Bezugsquelle</b>	<a href="http://dx.doi.org/10.1007/s11663-016-0689-7">http://dx.doi.org/10.1007/s11663-016-0689-7</a>
<b>Deskriptoren</b>	ALUMOSILICATE; FLÜSSIGE SCHLACKE; GLASSCHMELZE (GESCHMOLZENES GLAS); ALKALIMETALLION; LITHIUMION; NATRIUMION; KALIUMION; MAGNETISCHES KERNRESONANZSPEKTRUM; KERNRESONANZSPEKTROMETRIE; STRUKTUR DER SCHMELZE; STRUKTURANALYSE; NETZWERKWANDLER (GLAS); NICHTBRÜCKENSAUERSTOFF (GLASAUFBAU);
<b>Standort</b>	VDEh P.5.497(Met.trans.B)
<b>DB-Objekt-Nr.</b>	789568 (LS2 2016 22 8)

## 2.3 Metallurgische Grundlagen

<b>Schlagwörter</b>	<b>STAHLENTPHOSPHORUNG; METALL-SCHLACKENREAKTION; SPONTANE EMULGIERUNG</b>
<b>Titel deutsch</b>	Untersuchung der Ursachen der spontanen Emulgierung eines freien Stahltropfens; Validierung des chemischen Austauschpfads
<b>Titel original</b>	<b>Investigation into the cause of spontaneous emulsification of a free steel droplet; validation of the chemical exchange pathway</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	<p>Small Fe-based droplets have been heated to a molten phase suspended within a slag medium to replicate a partial environment within the basic oxygen furnace (BOF). The confocal scanning laser microscope (CSLM) has been used as a heating platform to interrogate the effect of impurities and their transfer across the metal/slag interface, on the emulsification of the droplet into the slag medium. The samples were then examined through X-ray computer tomography (XCT) giving the mapping of emulsion dispersion in 3D space, calculating the changing of interfacial area between the two materials, and changes of material volume due to material transfer between metal and slag. Null experiments to rule out thermal gradients being the cause of emulsification have been conducted as well as replication of the previously reported study by Assis et al which has given insights into the mechanism of emulsification. Finally chemical analysis was conducted to discover the transfer of oxygen to be the cause of emulsification, leading to a new study of a system with undergoing oxygen equilibration. Chemical analysis of samples from the study by Assis et al appear to show that phosphorus movement across the interface between a metal drop and slag is not responsible for spontaneous emulsification. Instead it is hypothesized that oxygen partition in either direction across the interface causes a drop in interfacial tension through surfactant effects and active refining. This is supported by a system where only oxygen content was drastically away from equilibrium, showing similar behavior to that seen previously (apart from a slight delay). The replication of the previous study with a different HT-CSLM showed very different melting times for the metal droplet and as a result a changed pathway of droplet morphology through the reaction period. Discussion has been given as to why these differences may have been seen, with heating performance, and sample preparation being the clearest possibilities. It has also been seen that prior to emulsification the droplet appears to show substantial roughening over the entire surface of the droplet, a link to the emulsification mechanism.</p>
<b>Autor(en)</b>	Spooner, Stephen; Assis, Andre N.; Warnett, Jason; Fruehan, Richard; Williams, Mark A.; Sridhar, Seetharaman
<b>Institution(en)</b>	University of Warwick, Coventry, GB; Carnegie Mellon University, Pittsburgh, PA, US
<b>Quelle</b>	Metallurgical and Materials Transactions B, Process Metallurgy and Materials Processing Science
<b>Band/Jahrgang</b>	47B
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	4
<b>Seiten von-bis</b>	S.2123-2132
<b>S/Bild/Tab/Qu</b>	10S,8B,8T,52Q
<b>Bezugsquelle</b>	<a href="http://dx.doi.org/10.1007/s11663-016-0700-3">http://dx.doi.org/10.1007/s11663-016-0700-3</a>
<b>Deskriptoren</b>	STAHLENTPHOSPHORUNG; STAHLHERSTELLUNG; METALL-SCHLACKENREAKTION; EMULGIEREN; BLASSTAHLVERFAHREN; LD-VERFAHREN; KONFOKALE MIKROSKOPIE; STOFFÜBERGANG; TRANSPORTEIGENSCHAFT; GRENZFLÄCHENREAKTION; TROPFENBILDUNG; REAKTIONSKINETIK; COMPUTERTOMOGRAPHIE;
<b>Standort</b>	VDEh P.5.497(Met.trans.B)
<b>DB-Objekt-Nr.</b>	789563 (LS2 2016 22 9)

## 2.3 Metallurgische Grundlagen

<b>Schlagwörter</b>	<b>FUNKTIONSGRADIENTENWERKSTOFF; GRENZFLÄCHENREAKTION; TITANCARBIDVERSTÄRKUNG</b>
<b>Titel deutsch</b>	Untersuchungen zu Grenzflächenphänomenen in Systemen Titancarbid/Stahlschmelze zur Herstellung von Funktionsgradientenwerkstoffen
<b>Titel original</b>	<b>Studies on interfacial phenomena in titanium carbide/liquid steel systems for development of functionally graded material</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	<p>In modern materials' applications, versatile, often contradictory requirements are set for properties like high strength, hardness, and toughness. However, e.g. in steel castings, typically only certain surfaces should be hard and wear resistant, whereas the other 'bulk' might have only standard properties. Then the critical parts of the surface should be 'locally reinforced' to get functionally graded material. Expensive alloying elements are saved, and manufacturing stages are minimized. Titanium carbide is an extremely hard material widely applied in carbide tools. It could be used to reinforce steel castings. When TiC particles are added to liquid steel, wettability, stability, and dissolution are key phenomena that should be understood to better design and control manufacturing processes. In this work, the interfacial phenomena and reactions between TiC and iron/steel melts were examined by wetting experiments with special emphasis on the influence of Cr, Ni, and Mo. No significant effect on wettability was observed by Ni or Mo. High Cr melts showed somewhat higher contact angles. Partial penetration of liquid metal took place in the substrate along the grain boundaries. Ni seemed to promote penetration. During longer experiments, re-precipitation of carbides occurred on the liquid droplet influencing the apparent wetting angle. Cr and Mo promoted carbide formation.</p>
<b>Autor(en)</b>	Kiviö, Miia; Holappa, Lauri; Louhenkilpi, Seppo; Nakamoto, Masashi; Tanaka, Toshihiro
<b>Institution(en)</b>	Aalto University, FI; Osaka University, JP
<b>Quelle</b>	Metallurgical and Materials Transactions B, Process Metallurgy and Materials Processing Science
<b>Band/Jahrgang</b>	47B
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	4
<b>Seiten von-bis</b>	S.2114-2122
<b>S/Bild/Tab/Qu</b>	9S,8B,4T,28Q
<b>Bezugsquelle</b>	<a href="http://dx.doi.org/10.1007/s11663-016-0658-1">http://dx.doi.org/10.1007/s11663-016-0658-1</a>
<b>Deskriptoren</b>	FUNKTIONSGRADIENTENWERKSTOFF; GRADIENTENSCHICHT; PARTIKELVERSTÄRKTER VERBUNDWERKSTOFF; TEILCHENVERSTÄRKUNG; NICHTTROTENDER AUSTENITISCHER STAHL; CHROM-NICKEL-MOLYBDÄN-STAHL; TITANCARBID; GRENZFLÄCHENREAKTION; KONTAKTWINKEL; BENETZBARKEIT; FLÜSSIGER STAHL; HOCHLEGIERTER STAHL; THERMODYNAMISCHE ANALYSE; THERMODYNAMIK; MIKROGEFÜGE; RASTERELEKTRONENMIKROSKOPIE;
<b>Standort</b>	VDEh P.5.497(Met.trans.B)
<b>DB-Objekt-Nr.</b>	789562 (LS2 2016 22 10)

## 2.3 Metallurgische Grundlagen

<b>Schlagwörter</b>	<b>SCHROTTEINSCHMELZEN; KUPFERVERDAMPFUNG; VERDAMPFUNGSMECHANISMUS</b>
<b>Titel deutsch</b>	Verdampfungsmechanismus von Cu aus schmelzflüssigen C- und S-haltigem Fe
<b>Titel original</b>	<b>Evaporation mechanism of Cu from liquid Fe containing C and S</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	<p>A number of liquid-gas experiments were carried out in order to elucidate evaporation mechanism of Cu from liquid Fe containing C and S. Rate of Cu evaporation in liquid Fe droplets at 1873 K (1600 deg C) was determined using electromagnetic levitation equipment. Evaporation rate of the Cu under various conditions (flow rate of gas mixtures, initial C, and S concentrations) was examined. It was found from a series of kinetic analyses of the experimental data that Cu evaporates in forms of Cu(g) and CuS(g). As was reported earlier for the Sn evaporation from liquid iron, S plays two roles for the evaporation of Cu: accelerating the rate by forming CuS(g) and decelerating the rate by blocking evaporation sites. As a result of these combinatorial effects, the evaporation of Cu is decelerated at low S content, but is accelerated at high S content. Based on the elucidated mechanism, an evaporation model equation for Cu was developed in the present study, which takes into account (1) evaporation of Cu in the two forms (Cu(g) and CuS(g)), (2) surface blocking by S using ideal Langmuir adsorption, and (3) effect of C. The obtained rate constant of a reaction <math>\text{Cu}(i) + \text{S}(i) = \text{CuS}(i)(g)</math>, <math>k(\text{CuS})(R)</math>, is <math>1.37 \times 10^{(exp -9)} \text{ m}(exp 4)/(\text{mol.s})</math>, and the residual rate constant, <math>k(\text{CuS})(r)</math>, is <math>4.11 \times 10^{(exp -10)} \text{ m}(exp 4)/(\text{mol.s})</math> at 1873 K (1600 deg C). Both of them were found to be one order lower than those for Sn evaporation.</p>
<b>Autor(en)</b>	Jung, Sung-Hoon; Kang, Youn-Bae
<b>Institution(en)</b>	Pohang University of Science and Technology, KR
<b>Quelle</b>	Metallurgical and Materials Transactions B, Process Metallurgy and Materials Processing Science
<b>Band/Jahrgang</b>	47B
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	4
<b>Seiten von-bis</b>	S.2164-2176
<b>S/Bild/Tab/Qu</b>	13S,12B,2T,46Q
<b>Bezugsquelle</b>	<a href="http://dx.doi.org/10.1007/s11663-016-0601-5">http://dx.doi.org/10.1007/s11663-016-0601-5</a>
<b>Deskriptoren</b>	SCHROTTSCHMELZEN; BEGLEITELEMENT; KUPFER; VERDAMPFUNG; STAHLSCHROTT; REAKTIONSMCHANISMUS; STOFFÜBERGANG; REAKTIONSKINETIK; THERMODYNAMIK; KOHLENSTOFFGEHALT; SCHWEFELGEHALT;
<b>Standort</b>	VDEh P.5.497(Met.trans.B)
<b>DB-Objekt-Nr.</b>	789567 (LS2 2016 22 11)

## 2.3 Metallurgische Grundlagen

<b>Schlagwörter</b>	<b>ROHEISENENTPHOSPHORUNG; VERTEILUNGSKOEFFIZIENT; MODELLVERGLEICH</b>
<b>Titel deutsch</b>	Kritische Bewertung von Vorhersagemodellen für die Phosphorverteilung zwischen CaO-Schlacken und Eisenbasisschmelzen während des Entphosphorungsprozesses
<b>Titel original</b>	<b>Critical evaluation of prediction models for phosphorus partition between CaO-based slags and iron-based melts during dephosphorization processes</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	According to the experimental results of hot metal dephosphorization by CaO-based slags at a commercial-scale hot metal pretreatment station, the collected 16 models of equilibrium quotient $k_P$ or phosphorus partition $L_P$ between CaO-based slags and iron-based melts from the literature have been evaluated. The collected 16 models for predicting equilibrium quotient $k_P$ can be transferred to predict phosphorus partition $L_P$ . The predicted results by the collected 16 models cannot be applied to be criteria for evaluating $k_P$ or $L_P$ due to various forms or definitions of $k_P$ or $L_P$ . Thus, the measured phosphorus content pct P in a hot metal bath at the end point of the dephosphorization pretreatment process is applied to be the fixed criteria for evaluating the collected 16 models. The collected 16 models can be described in the form of linear functions as $y = c(0) + c(1)x$ , in which independent variable $x$ represents the chemical composition of slags, intercept $c(0)$ including the constant term depicts the temperature effect and other unmentioned or acquiescent thermodynamic factors, and slope $c(1)$ is regressed by the experimental results of $k_P$ or $L_P$ . Thus, a general approach to developing the thermodynamic model for predicting equilibrium quotient $k_P$ or phosphorus partition $L_P$ or pct P in iron-based melts during the dephosphorization process is proposed by revising the constant term in intercept $c(0)$ for the summarized 15 models except for Suito's model (M3). The better models with an ideal revising possibility or flexibility among the collected 16 models have been selected and recommended. Compared with the predicted result by the revised 15 models and Suito's model (M3), the developed IMCT- $L_P$ model coupled with the proposed dephosphorization mechanism by the present authors can be applied to accurately predict phosphorus partition $L_P$ with the lowest mean deviation $\delta(L_P)$ of $\log(L_P)$ as 2.33, as well as to predict pct P in a hot metal bath with the smallest mean deviation $\delta(\%P)$ of pct P as 12.31.
<b>Autor(en)</b>	Yang, Xue-Min; Li, Jin-Yan; Chai, Guo-Ming; Duan, Dong-Ping; Zhang, Jian
<b>Institution(en)</b>	Institute of Process Engineering, Chinese Academy of Sciences, Beijing, CN; University of Science and Technology Beijing, CN; Shanxi Taigang Stainless Steel, Taiyuan, CN
<b>Quelle</b>	Metallurgical and Materials Transactions B, Process Metallurgy and Materials Processing Science
<b>Band/Jahrgang</b>	47B
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	4
<b>Seiten von-bis</b>	S.2302-2329
<b>S/Bild/Tab/Qu</b>	28S,9B,4T,99Q
<b>Bezugsquelle</b>	<a href="http://dx.doi.org/10.1007/s11663-016-0653-6">http://dx.doi.org/10.1007/s11663-016-0653-6</a>
<b>Deskriptoren</b>	STAHL-ENTPHOSPHORUNG; METALL-SCHLACKENREAKTION; THERMODYNAMIK; THERMODYNAMISCHE AKTIVITÄT; THERMODYNAMISCHE ANALYSE; THERMODYNAMISCHES MODELL; AKTIVITÄTSKOEFFIZIENT; AKTIVITÄTSKOEFFIZIENTENABSCHÄTZVERFAHREN; AKTIVITÄTSKOEFFIZIENTENMODELL; VERTEILUNGSKOEFFIZIENT; MODELLSIMULATION; MATHEMATISCHES MODELL; VORHERSAGEMODELL; METHODENVERGLEICH; MODELLVERGLEICH; ROHEISEN; Roheisenentphosphorung; Roheisenvorbehandlung
<b>Standort</b>	VDEh P.5.497(Met.trans.B)
<b>DB-Objekt-Nr.</b>	789577 (LS2 2016 22 12)

## 2.3 Metallurgische Grundlagen

<b>Schlagwörter</b>	<b>ROHEISENENTPHOSPHORUNG; PHOSPHORVERTEILUNG; THERMODYNAMISCHES MODELL</b>
<b>Titel deutsch</b>	Thermodynamisches Modell zur Vorhersage der Phosphorverteilung zwischen CaO-Schlacken und Roheisen während der Entphosphorung im Rahmen der Roheisenvorbehandlung auf Basis der Theorie der Koexistenz von Ionen und Molekülen
<b>Titel original</b>	<b>A thermodynamic model for predicting phosphorus partition between CaO-based slags and hot metal during hot metal dephosphorization pretreatment process based on the ion and molecule coexistence theory</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	<p>A thermodynamic model for predicting phosphorus partition <math>L_p</math> between a CaO-based slags and hot metal during hot metal dephosphorization pretreatment process has been developed based on the ion and molecule coexistence theory (IMCT), i.e, the IMCT-<math>L_p</math> model. The reaction abilities of structural units or ion couples in the CaO-based slags have been represented by the calculated mass action concentrations <math>N_i</math> through the developed IMCT-<math>N(i)</math> model based on the IMCT. The developed IMCT-<math>L_p</math> model has been verified to be valid through comparing with the measured <math>L_p</math> as well as the predicted <math>L_p</math> by two reported <math>L_p</math> models from the literature. Besides the total phosphorus partition <math>L_p</math> between the CaO-based slag and hot metal, the respective phosphorus partitions <math>L(p,i)</math> of nine dephosphorization products as <math>P_2O_5</math>, <math>(3FeO)(P_2O_5)</math>, <math>(4FeO)(P_2O_5)</math>, <math>(2CaO)(P_2O_5)</math>, <math>(3CaO)(P_2O_5)</math>, <math>(4CaO)(P_2O_5)</math>, <math>(2MgO)(P_2O_5)</math>, <math>(3MgO)(P_2O_5)</math>, and <math>(3MnO)(P_2O_5)</math> can also be accurately predicted by the developed IMCT-<math>L_p</math> model. The formed <math>(3CaO)(P_2O_5)</math> accounts for 99.20 pct of dephosphorization products comparing with the generated <math>(4CaO)(P_2O_5)</math> for 0.08 pct. The comprehensive effect of <math>CaO + Fe(t)O</math> controls dephosphorization ability of the CaO-based slags. A linear relationship of <math>L_p</math> against <math>(pct Fe(t)O)/(pct CaO)</math> can be correlated compared with a parabolic relationship of <math>L_p</math> against <math>N(Fe(t)O)/N(CaO)</math>, while the linear relationship of <math>L_p</math> against <math>(pct Fe(t)O) \times (pct CaO)</math> or <math>N(Fe(t)O)(exp 5) \times N(CaO)(exp 3)</math> can be established. Thus, the mass percentage product <math>(pct Fe(t)O) \times (pct CaO)</math> and the mass action concentration product <math>N(Fe(t)O)(exp 5) \times N(CaO)(exp 3)</math> are recommended to represent the comprehensive effect of <math>CaO + Fe(t)O</math> on dephosphorization ability of the CaO-based slags. Furthermore, a parabolic relationship of <math>L_p</math> against binary basicity or complex basicity <math>CB_2</math> and <math>CB_3</math> can be established at binary basicity in 1.8 or at complex basicity <math>CB_2</math> and <math>CB_3</math> in 2.0 corresponding to the maximum of dephosphorization ability of the CaO-based slags. However, the linear relationship between <math>L_p</math> and optical basicity can only be correlated with the mathematically regressed <math>\lambda(FeO) = 1.0</math> and <math>\lambda(Fe_2O_3) = 0.75</math>. A great gradient of oxygen potential or oxygen activity <math>a(\%,O)</math> between the dynamically formed metal film beneath slag-metal interface and hot metal bath is the main driving forces of hot metal dephosphorization by the CaO-based slags.</p>
<b>Autor(en)</b>	Yang, Xue-min; Li, Jin-yan; Chai, Guo-ming; Duan, Dong-ping; Zhang, Jian
<b>Institution(en)</b>	Institute of Process Engineering, Chinese Academy of Sciences, Beijing, CN; University of Science and Technology Beijing, CN; Shanxi Taigang Stainless Steel, Taiyuan, CN
<b>Quelle</b>	Metallurgical and Materials Transactions B, Process Metallurgy and Materials Processing Science
<b>Band/Jahrgang</b>	47B
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	4
<b>Seiten von-bis</b>	S.2279-2301
<b>S/Bild/Tab/Qu</b>	23S,13B,4T,112Q
<b>Bezugsquelle</b>	<a href="http://dx.doi.org/10.1007/s11663-016-0652-7">http://dx.doi.org/10.1007/s11663-016-0652-7</a>
<b>Deskriptoren</b>	STAHL-ENTPHOSPHORUNG; VERTEILUNGSKOEFFIZIENT; AKTIVITÄTSKOEFFIZIENT; THERMODYNAMIK; THERMODYNAMISCHE ANALYSE; THERMODYNAMISCHE AKTIVITÄT; THERMODYNAMISCHES MODELL; MODELLSIMULATION; MATHEMATISCHES MODELL; METALL-SCHLACKENREAKTION; AKTIVITÄTSKOEFFIZIENTENABSCHÄTZVERFAHREN; AKTIVITÄTSKOEFFIZIENTENMODELL; BASISCHE SCHLACKE; OPTISCHE BASISITÄT (SCHMELZEN); Roheisenentphosphorung; Roheisenvorbehandlung
<b>Standort</b>	VDEh P.5.497(Met.trans.B)
<b>DB-Objekt-Nr.</b>	789576 (LS2 2016 22 13)

## 2.4 Blasstahlherstellung

<b>Schlagwörter</b>	<b>BLASSTAHLVERFAHREN; ZWEISTUFIGER BLASPROZESS; PROZESSOPTIMIERUNG</b>
<b>Titel deutsch</b>	Steigerung der Effizienz des MURC-Prozesses (Multi-Refining Converter) im Blasstahlwerk der Yawata Works
<b>Titel original</b>	<b>Improvement of the efficiency of Multi-Refining Converter (MURC) process at steelmaking shop in Yawata Works</b>
<b>Dokumentart</b>	CD-ROM (Teilauswertung); Tagungsbeitrag
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	<p>Global oversupply of steel products in the last decade has required improvements of their cost competitiveness. Therefore, the application of hot metal pre-treatment processes such as MURC (Multi-Refining Converter) process, in which dephosphorization and decarburization are performed continuously in a single converter, has been enlarged in Nippon Steel &amp; Sumitomo Metal Corporation. In Yawata works, the pre-treatment proportion by MURC process was successfully increased by reducing the process time, which was achieved by increasing the flow rate of top blown oxygen gas and by application of incorrect expansion nozzle at MURC blow 2. Specific conclusions include: 1) The flow rate of top blown oxygen gas was successfully increased in the decarburization period without lowering metallurgical reaction efficiencies. 2) The metal adhesion to furnace mouth and scattered slag generation out of converter were improved by the effect of incorrect expansion. 3) The rate of scattered slag generation tended to increase as the cavity angle increased, which showed excellent agreement with the past knowledge. Additionally, the reaction efficiency of dephosphorization at MURC blow 1 was improved by increasing bottom stirring force. Phosphorus distribution ratio was greatly improved by 65% and (%T.Fe) was decreased by 25%, by increasing bottom stirring force at MURC blow 1. Despite that the equilibrium phosphorus concentration, P(eq), was deteriorated, the dephosphorization rate was improved when bottom stirring force was increased. This is because the effect of mass transfer coefficient improvement was larger than that of P(eq) deterioration. Excessive reinforcement of stirring force would lower the dephosphorization rate because the negative effect of P(eq) deterioration would become larger than the positive effect of mass transfer coefficient improvement.</p>
<b>Autor(en)</b>	Tanaka, Yasuhiro; Asahara, Norifumi; Maruo, Ryota; Nakae, Taichi; Kaneyasu, Takayuki
<b>Institution(en)</b>	Nippon Steel & Sumitomo Metal, Kitakyushu, JP
<b>Quelle</b>	AISTech 2016, Iron and Steel Technology Conference and Exhibition, AIST, Proceedings, Pittsburgh, PA, US, May 16-19, 2016
<b>Verlag</b>	Warrendale, PA, US: AIST ( <a href="http://www.aist.org">www.aist.org</a> )
<b>Band/Jahrgang</b>	2
<b>Erscheinungsjahr</b>	2016
<b>Papier-, Reportn.</b>	Datei: /AISTech2016-pdf-papers/20614.pdf
<b>Seiten von-bis</b>	S.945-957
<b>S/Bild/Tab/Qu</b>	13S,20B,2T,8Q,352kB
<b>Deskriptoren</b>	BLASSTAHLVERFAHREN; LD-KONVERTER; LD-VERFAHREN; STAHLENTKOHLUNG; STAHLENTPHOSPHORUNG; PROZESSOPTIMIERUNG; REAKTIONSKINETIK; REAKTIONSMCHANISMUS; MURC (Multi-Refining Converter)
<b>Standort</b>	VDEh CDR 195(2016)
<b>DB-Objekt-Nr.</b>	789614 (LS2 2016 22 14)

## 2.4 Blasstahlherstellung

<b>Schlagwörter</b>	<b>KONVERTERPROZESS; NACHVERBRENNUNG; BLASLANZE</b>
<b>Titel deutsch</b>	Sauerstoffanlagen zur Nachverbrennung im LD-Konverter - jüngste Fortschritte und Ergebnisse aus vier Kontinenten
<b>Titel original</b>	<b>BOF post-combustion oxygen lances - new advancements and results from four continents</b>
<b>Dokumentart</b>	CD-ROM (Teilauswertung); Tagungsbeitrag
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	BOF Post Combustion oxygen lances have been used for several years in the North American steel industry to help improve the steelmaking process and to improve lance life by reducing lance skulls. By optimizing the Post Combustion (PC) design, steelmakers can reduce or eliminate lance barrel skulls and build-up on the furnace mouth as well as utilize the increase in chemical energy to help with increased scrap charges. This paper reviews new developments in the field of PC, Double Flow Distributors, and results and benefits of PC technology from steel plants across the globe who struggle with lance and furnace skulls. Decreasing heat times, reducing maintenance down-time, and the ability to vary the scrap to hot metal ratio based on scrap prices makes Post Combustion an effective tool to have in the BOF arsenal.
<b>Autor(en)</b>	Valentas, Louis S.; Straughen, Dale T.; Bugar, Gary S.
<b>Institution(en)</b>	Berry Metal, Harmony, PA, US
<b>Quelle</b>	AISTech 2016, Iron and Steel Technology Conference and Exhibition, AIST, Proceedings, Pittsburgh, PA, US, May 16-19, 2016
<b>Verlag</b>	Warrendale, PA, US: AIST (www.aist.org)
<b>Band/Jahrgang</b>	2
<b>Erscheinungsjahr</b>	2016
<b>Papier-, Reportn.</b>	Datei: /AISTech2016-pdf-papers/20615.pdf
<b>Seiten von-bis</b>	S.959-966
<b>S/Bild/Tab/Qu</b>	8S,5B,6Q,208kB
<b>Deskriptoren</b>	BLASSTAHLVERFAHREN; LD-VERFAHREN; LD-KONVERTER; NACHVERBRENNUNG; SAUERSTOFFBLASLANZE; STAHLSCHEMELZBETRIEB;
<b>Standort</b>	VDEh CDR 195(2016)
<b>DB-Objekt-Nr.</b>	789615 (LS2 2016 22 15)



## 2.4 Blasstahlherstellung

<b>Schlagwörter</b>	<b>LD-KONVERTER; FEUERFESTE AUSKLEIDUNG; SCHLACKE-SCHUTZSCHICHT</b>
<b>Titel deutsch</b>	Bestimmung der Parameter für das Anblasen der flüssigen Schlacke zum Aufbringen auf die Konverterauskleidung
<b>Titel original</b>	<b>Titel russisch</b>
<b>Titel englisch</b>	Determination of parameters for blowing of liquid slag on converter lining
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Russisch
<b>Abstract</b>	Durch das Einleiten eines Stickstoffstromes unter hohem Druck auf die Oberfläche der im LD-Konverter verbliebenen flüssigen Schlacke aus der vorangegangenen Charge kann auf der Oberfläche der feuerfesten Auskleidung des Konverters eine Schlackeschicht aufgebracht werden, die eine Verlängerung der Lebensdauer der Auskleidung ermöglicht. An einem 260-t-LD-Konverter wurde durch direkte Messungen der Dicke und des Profils der aufgetragenen Schlackeschicht der Einfluss der technologischen und strömungstechnischen Parameter des Stickstoffeinblasens auf die Dicke und das Profil der auf der feuerfesten Auskleidung entstandenen Schlackeschicht bestimmt. Aus den Ergebnissen der Messungen wurden Regressionsgleichungen und eine Methodik abgeleitet, mit der die Parameter des Blasvorganges (z.B. Gasdruck, Blasdauer, Position der Blaslanze u.a.) berechnet werden können, die zur Ausbildung einer Schlackeschicht mit der gewünschten Schichtdicke und Oberflächengeometrie auf der feuerfesten Konverterauskleidung führen.
<b>Autor(en)</b>	Sigarev, E.N.; Sigarev, N.K.; Nedbaylo, N.N.; Bayduzh, Y.V.; Nizyaev, K.G.
<b>Institution(en)</b>	Dneprodzerzhinsk State Technical University, UA; National Metallurgical Academy of Ukraine, Dnepropetrovsk, UA
<b>Quelle</b>	Metallurgiceskaja i Gornorudnaja Promyslennost
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	3
<b>Seiten von-bis</b>	S.31-36
<b>S/Bild/Tab/Qu</b>	6S,4B,12Q
<b>Deskriptoren</b>	LD-KONVERTER; FEUERFESTE AUSKLEIDUNG; LEBENSDAUER; LD-SCHLACKE; SCHUTZSCHICHT; SCHICHTDICKE; SCHICHTDICKENMESSUNG; GASEINBLASEN; BLASLANZE; LAVALDÜSE; DÜSENANORDNUNG; BERECHNUNGSMETHODE;
<b>Standort</b>	VDEh P.5.1293
<b>DB-Objekt-Nr.</b>	789748 (LS2 2016 22 16)

## 2.5 Elektrostahlherstellung

<b>Schlagwörter</b>	<b>LICHTBOGENOFEN; PROZESSSTEUERUNG; ABGASANALYSESYSTEM</b>
<b>Titel deutsch</b>	Einsatz von SmartFurnace und des ZoloScan-Laserabgasinformationssystems zur Optimierung des Einschmelzens von Eisenschwamm bei Nucor Hickman
<b>Titel original</b>	<b>Using SmartFurnace and ZoloScan laser offgas information to optimize DRI melting at Nucor Hickman</b>
<b>Dokumentart</b>	CD-ROM (Teilauswertung); Tagungsbeitrag
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	Furnaces represent the largest cost and energy usage in steel mills. Maintaining efficiency and adapting to different circumstances is something needed in order to attain sustainable results. The off gas control module has proved remarkable benefits optimizing the EAF using the ZoloSCAN TDLAS off gas analyzer coupled to the SmartFurnace. The ZoloSCAN TDLAS off-gas analyzer system provides a reliable and fast real time measurement of the content of CO%, CO2%, H2O% and temperature in the off gas. The information is then sent to the SmartFurnace off-gas control module where it is used for closed loop control to optimize the fuels usage in the EAF. The capability to adapt to all changes caused by DRI usage has been enhanced making the process more safety with cleaner emission and more efficient. Using the CO and CO2 measurements form the ZoloSCAN system, the SmartFurnace off-gas control module reduces the effects of the variations in the DRI carbon content, allowing for a more efficient chemical energy usage in the EAF. The new control has been successfully implemented at Nucor Steel Arkansas (NSA). NSA has two DC Electric Arc Furnaces (EAF) using a DRI percentage in the scrap mix from 12% up to 40%. Both EAF operate with The SmartFurnace System. The SmartFurnace System was installed on EAF No 1 in 2013 and it includes the power input set-points, oxygen, natural gas, carbon flow set-points, and control of four supersonic burners with carbon injectors. It also includes automatic control of the DRI feed rate and timing of the DRI feed. In 2015 the ZoloSCAN TDLAS off gas analyzer was installed on EAF No 1 to improve the EAF efficiency in the use of chemical energy through the SmartFurnace System.
<b>Autor(en)</b>	Fernandez, Guillermo; Gonzalez, Saul; Grieshaber, Ken
<b>Institution(en)</b>	AMI GE, Monterrey, MX; Zolo Technologies, Louisville, CO, US
<b>Quelle</b>	AISTech 2016, Iron and Steel Technology Conference and Exhibition, AIST, Proceedings, Pittsburgh, PA, US, May 16-19, 2016
<b>Verlag</b>	Warrendale, PA, US: AIST (www.aist.org)
<b>Band/Jahrgang</b>	2
<b>Erscheinungsjahr</b>	2016
<b>Papier-, Reportn.</b>	Datei: /AISTech2016-pdf-papers/10513.pdf
<b>Seiten von-bis</b>	S.889-895
<b>S/Bild/Tab/Qu</b>	7S,8B,2T,2Q,279kB
<b>Deskriptoren</b>	ELEKTROSTAHLHERSTELLUNG; STAHLSCHEMELZBETRIEB; LICHTBOGENOFEN; ABGASANALYSE; ABSORPTIONSSPEKTROMETRIE; PROZESSSTEUERUNG UND -REGELUNG; EISENSCHWAMM; KOSTENSENKUNG; Laserabsorptionsspektrometrie
<b>Standort</b>	VDEh CDR 195(2016)
<b>DB-Objekt-Nr.</b>	789609 (LS2 2016 22 17)

## 2.5 Elektrostahlherstellung

<b>Schlagwörter</b>	<b>LICHTBOGENOFEN; SCHLACKENBILDUNG; MODELLSIMULATION</b>
<b>Titel deutsch</b>	Schlackenmodellierung zur Optimierung des Einsatzes von Schlackenbildnern im Stahlschmelzbetrieb auf Eisenschwammbasis
<b>Titel original</b>	<b>Slag modeling for optimizing the use of fluxes in a DRI-based steelmaking operation</b>
<b>Dokumentart</b>	CD-ROM (Teilauswertung); Tagungsbeitrag
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	Slag modeling of the Electric Arc Furnace (EAF) was initiated in August 2014 at ARCELOR Mittal - Villa Constitucion (AM-VC), using the mass balance developed by Eugene Pretorius (FoamyMB). The main goal was to reduce the specific consumption of basic monolithic refractory mixes used on the banks and bottom of the EAF. The main modeling results and the wear mechanism of banks and bottom are discussed. The FoamyMB model has proven to be a useful tool for simulating the heat process at the EAF for any type of metallic charge. Even though the recommendations were implemented with a lot of limitations (logistics, DRI quality variation) the results obtained so far are very encouraging. The use of separate sources of CaO & MgO, instead of a blended lime, would allow for a better control of the process and flexibility for developing different scenarios to achieve saturation (B3 & MgO).
<b>Autor(en)</b>	Lopez, F.; Farrando, A.; Lopez, M.; Picco, L.; Loeffelholz, Mark
<b>Institution(en)</b>	Magnesita, Contagem, BR; Magnesita, San Nicolas, AR; ARCELOR Mittal, Villa Constitucion, AR; Magnesita, York, PA, US
<b>Quelle</b>	AISTech 2016, Iron and Steel Technology Conference and Exhibition, AIST, Proceedings, Pittsburgh, PA, US, May 16-19, 2016
<b>Verlag</b>	Warrendale, PA, US: AIST (www.aist.org)
<b>Band/Jahrgang</b>	2
<b>Erscheinungsjahr</b>	2016
<b>Papier-, Reportn.</b>	Datei: /AISTech2016-pdf-papers/10511.pdf
<b>Seiten von-bis</b>	S.875-880
<b>S/Bild/Tab/Qu</b>	6S,8B,5T,374kB
<b>Deskriptoren</b>	ELEKTROSTAHLHERSTELLUNG; LICHTBOGENOFEN; FEUERFESTE AUSKLEIDUNG; FEUERFESTVERBRAUCH; MODELLSIMULATION; MATHEMATISCHES MODELL; STAHLSCHEMELZBETRIEB; STOFFBILANZ; PROZESSMODELL; PROZESSOPTIMIERUNG;
<b>Standort</b>	VDEh CDR 195(2016)
<b>DB-Objekt-Nr.</b>	789607 (LS2 2016 22 18)

## 2.5 Elektrostahlherstellung

<b>Schlagwörter</b>	<b>LICHTBOGENOFEN; EISENSCHWAMMEINSATZ; PROZESSOPTIMIERUNG</b>
<b>Titel deutsch</b>	Handhabung des Eisenschwamm-Feinanteils zur Maximierung des Eisenausbringens im Lichtbogenofen
<b>Titel original</b>	<b>Management of DRI fines to maximize iron yield in the EAF</b>
<b>Dokumentart</b>	CD-ROM (Teilauswertung); Tagungsbeitrag
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	<p>Yield is always an important cost consideration in the melt shop, but during periods of lower production, it has an outsized effect. In an all DRI-fed EAF, DRI pellet diameter can directly affect yield - if too small low, DRI can short circuit the EAF by floating in the slag and exiting over the breast during slag off. If the pellet diameter is too large, metallization during reduction suffers, contributing to slag FeO. Therefore, management of DRI pellet size is critical. This includes first avoiding sub-sized green pellets entering the DRI reactors, to minimizing disintegration of pellets during reduction, to avoiding pellet breakdown en route to the EAF, and finally to screening out unwanted fines that remain in the EAF feed, and briquetting them. To minimize generation of fines, we have to study various pellet characteristics, such as porosity, which affects both pellet strength as well as reducibility. This characteristic affects yield directly by its link to generation of fines; but it also affects yield indirectly through its effect on metallization and DRI %C, both of which influence yield through slag FeO level. The efforts are focusing on minimization of generation of sub-sized pellets in the first place, and then devising a melting practice that best optimizes recycling of the briquetted DRI fines that remain. This paper builds on last year's paper, where the efforts to study all factors contributing to subsized DRI pellets in the process stream were highlighted. An important aspect is development of a melting practice for recycling the briquetted fines. This entails a pre-melting step, where the briquettes are charged ahead of the DRI feed stage to make use of the hot heel in the furnace. In this step, the normally intense slag foaming associated with melting of the DRI is reduced, and there is minimal slag off, so that as the briquettes disintegrate and melt, they are contained in the furnace, contributing valuable iron units to the heat.</p>
<b>Autor(en)</b>	Lule Gonzalez, Ruben; Lopez Acosta, Francisco; Lowry, Michael; Kundrat, David; Wyatt, Allen; Fuchs, Hagen
<b>Institution(en)</b>	ArcelorMittal Lazaro Cardenas, MX; ArcelorMittal USA Research Center, East Chicago, IN, US; SGL Group, Wiesbaden, DE
<b>Quelle</b>	AISTech 2016, Iron and Steel Technology Conference and Exhibition, AIST, Proceedings, Pittsburgh, PA, US, May 16-19, 2016
<b>Verlag</b>	Warrendale, PA, US: AIST ( <a href="http://www.aist.org">www.aist.org</a> )
<b>Band/Jahrgang</b>	2
<b>Erscheinungsjahr</b>	2016
<b>Papier-, Reportn.</b>	Datei: /AISTech2016-pdf-papers/10512.pdf
<b>Seiten von-bis</b>	S.881-888
<b>S/Bild/Tab/Qu</b>	8S,7B,1T,2Q,368kB
<b>Deskriptoren</b>	STAHLSCHEMELZBETRIEB; LICHTBOGENOFEN; ELEKTROSTAHLHERSTELLUNG; EISENSCHWAMM; PROZESSOPTIMIERUNG; AUSBRINGEN; DIREKTREDUKTION; ERZBRIKETT; EISENERZ; GRÜNPELLETS; ERZKONZENTRAT-PELLETS;
<b>Standort</b>	VDEh CDR 195(2016)
<b>DB-Objekt-Nr.</b>	789608 (LS2 2016 22 19)

## 2.5 Elektrostahlherstellung

### Schlagwörter

**ELEKTROSTAHLHERSTELLUNG; EISENSCHWAMMEINSCHMELZEN;  
KOHLENSTOFFÜBERGANG; STICKSTOFFGEHALT**

### Titel deutsch

Kohlenstoffübergang beim Einschmelzen von Eisenschwamm

### Titel original

**Carbon transfer during melting of direct-reduced iron**

### Dokumentart

CD-ROM (Teilauswertung); Tagungsbeitrag

### Sprache(n)

Englisch

### Abstract

Higher-carbon direct-reduced iron (DRI) potentially provides several advantages in electric furnace steelmaking; the carbon is a source of chemical energy, contributes to slag foaming and also helps to lower nitrogen, through the carbon boil. While there is ample industrial evidence of the beneficial effect of DRI in producing lower-nitrogen steels, previous laboratory measurements did not show a direct nitrogen removal effect - the pellets reacted within the slag, or would lose their carbon by reacting with FeO within the pellets below 1200 deg C if charged in the scrap basket. In that work, it was concluded that DRI served to lower the nitrogen content of the steel by dilution only. However, those laboratory measurements had been done on DRI containing only 1.6% carbon, and with 94% metallization; DRI with much higher carbon concentrations - 4% or higher - is now available, with most of the carbon in the form of cementite. The work presented here tested whether carbon transfer from higher-carbon DRI to the steel bath can be demonstrated under laboratory conditions. It might be expected that pellet buoyancy would limit carbon transfer: typical steelmaking slag with 30% FeO has a density of approximately 3000 kg/m<sup>3</sup>, whereas the typical apparent density of carburized DRI pellets in this work was found to be around 2500 kg/m<sup>3</sup>. Direct interaction of added DRI pellets with the metal bath was observed for both higher-carbon (5.3% C) and lower-carbon (2.2% C) fully metallized DRI, upon dropping the pellets into a crucible containing both molten crude steel and steelmaking slag, at 1600 deg C. This contrasts with previous laboratory results, in which the droplet (formed when the DRI melted) remained suspended in the slag until most of the carbon was oxidized to carbon monoxide. Likely reasons for the stronger interaction between the DRI and the metal bath observed in the present work are the fully metallized nature of the DRI used in this work (eliminating CO evolution before melting of the DRI), the presence of a metal bath with which the pellets could interact, and the higher carbon concentration in the DRI used in this work.

### Autor(en)

He, Yining; Pistorius, P. Chris

### Institution(en)

Carnegie Mellon University, Pittsburgh, PA, US

### Quelle

AISTech 2016, Iron and Steel Technology Conference and Exhibition, AIST, Proceedings, Pittsburgh, PA, US, May 16-19, 2016

### Verlag

Warrendale, PA, US: AIST ([www.aist.org](http://www.aist.org))

### Band/Jahrgang

2

### Erscheinungsjahr

2016

### Papier-, Reportn.

Datei: /AISTech2016-pdf-papers/10514.pdf

### Seiten von-bis

S.897-902

### S/Bild/Tab/Qu

6S,5B,1T,14Q,326kB

### Deskriptoren

ELEKTROSTAHLHERSTELLUNG; STOFFÜBERGANG; STAHLSCHEMELZBETRIEB;  
LICHTBOGENOFEN; EISENSCHWAMM; STICKSTOFF; KOHLENSTOFFGEHALT;  
VDEh CDR 195(2016)

### Standort

789610

### DB-Objekt-Nr.

(LS2 2016 22 20)

## 2.5 Elektrostahlherstellung

<b>Schlagwörter</b>	<b>LICHTBOGENOFEN; EINZELKORBBESCHICKUNG; ANLAGENPLANUNG</b>
<b>Titel deutsch</b>	Umstellung des Lichtbogenofens bei Nucor-Yamato Steel auf Beschickung mit nur einem Schrottkorb: Planung, Auslegung und Ergebnisse
<b>Titel original</b>	<b>Single-bucket charge conversion at Nucor-Yamato Steel: planning, design and results</b>
<b>Dokumentart</b>	CD-ROM (Teilauswertung); Tagungsbeitrag
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	<p>In 2011, as part of their continuous efforts to improve safety, minimize unscheduled downtime, and reduce costs of its 2-furnace melt shop operation, Nucor-Yamato Steel (NYS) looked for ways to meet these goals. NYS investigated various new melt shop scenarios but all options yielded less-than-desirable results. A single-bucket furnace conversion, briefly considered before the investigation into a new melt shop, came back to the forefront. After several visits to other single-bucket charge shops, NYS and Superior Machine Company of SC (Superior) sat down over several months discussing the details and modifications needed to make this conversion project a 'go'. The key considerations for project success included: 1) Increase furnace charging size; 2) Increase scrap buck volume; 3) Increase shell inside diameter without replacing the existing tilt platform or existing electrode arms; 4) Modify scrap bucket transfer rail cars for increased, in-transit bucket stability. This paper recounts the conversion engineering, installation, and to-date performance results of the project that spanned from early 2013 to spring 2015. The results showed that the single bucket charge conversion at NYS delivered and exceeded all of the expected safety improvements, unscheduled downtime minimization, and most cost reduction goals. The close working relationship between NYS and Superior throughout all phases of the project led to on-time execution with no surprises upon equipment delivery to site. The work entailed 2 years, 4 shutdowns, with zero accidents.</p>
<b>Autor(en)</b>	McCauley, John; Clark, Charlie; Hartgraves, Larry; Quintanilla, Omar; Vassar, Jerry; Carraway, Kent; Andrews, Cary; Robie, Scott; Meyer, Steve
<b>Institution(en)</b>	Nucor Yamato Steel, Blytheville, AR, US; Superior Machine Company of SC, Florence, SC, US
<b>Quelle</b>	AISTech 2016, Iron and Steel Technology Conference and Exhibition, AIST, Proceedings, Pittsburgh, PA, US, May 16-19, 2016
<b>Verlag</b>	Warrendale, PA, US: AIST ( <a href="http://www.aist.org">www.aist.org</a> )
<b>Band/Jahrgang</b>	2
<b>Erscheinungsjahr</b>	2016
<b>Papier-, Reportn.</b>	Datei: /AISTech2016-pdf-papers/20511.pdf
<b>Seiten von-bis</b>	S.731-746
<b>S/Bild/Tab/Qu</b>	16S,20B,2T,1173kB
<b>Deskriptoren</b>	ELEKTROSTAHLHERSTELLUNG; LICHTBOGENOFEN; BESCHICKEN (OFEN); SCHROTTEINSATZ; ANLAGENPLANUNG; STAHLSCHMELZBETRIEB; PROZESSOPTIMIERUNG; SCHROTTSCHMELZEN;
<b>Standort</b>	VDEh CDR 195(2016)
<b>DB-Objekt-Nr.</b>	789619 (LS2 2016 22 21)

## 2.7 Sekundärmetallurgie

<b>Schlagwörter</b>	<b>UMLAUFENTGASER; STRÖMUNGSMUSTER; WASSERMODELL</b>
<b>Titel deutsch</b>	Durch die Abwärtsströmung verursachte Durchmischung der Flüssigkeit in der Pfanne im RH-Entgaser
<b>Titel original</b>	<b>Fluid mixing in ladle of RH degasser induced by down flow</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	<p>In order to understand the effect of down flow in RH ladle on mixing time, the relationship among flow patterns, circulation and mixing phenomena were examined by using three sizes of model RH. The temporal change in electric conductivity in ion-exchanged water was tracked after injecting KCl solution and the decoloration process of iodine color in ion-exchanged water was observed visually after injecting sodium thiosulfate solution. There were two mixing patterns in the ladle: One has a damping oscillation curve for a tracer response and the decoloration reaction occurred everywhere and uniformly, the other has a monotonical decreasing tracer curve after an overshoot and the decoloration delayed near the free surface of the ladle. The <math>(t_M/t_R)/(D_{leg}/H)</math> values decreased with the increase in <math>Re</math> below <math>Re = 1.8 \times 10^4</math> and it was kept to be constant above <math>Re = 1.8 \times 10^4</math> where <math>t_M</math>: the mixing time (s), <math>t_R</math>: the mean residence time (s) of fluid in the ladle, <math>D_{leg}</math>: the inner diameter of down-leg (m) and <math>H</math>: the length of jet axis between down-leg outlet and jet-impinged wall (m). In the region of <math>Re &gt; 1.8 \times 10^4</math>, the mixing was controlled by the circulating flow, whereas in the region of <math>Re &lt; 1.8 \times 10^4</math> the mixing behavior was influenced by the stagnation zone near the free surface of the ladle.</p>
<b>Autor(en)</b>	Yoshitomi, Kota; Nagase, Misato; Uddin, Mohammad Azhar; Kato, Yoshiei
<b>Institution(en)</b>	Okayama University, JP
<b>Quelle</b>	ISIJ International
<b>Band/Jahrgang</b>	56
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	7
<b>Seiten von-bis</b>	S.1119-1123
<b>S/Bild/Tab/Qu</b>	5S,9B,3T,22Q
<b>Bezugsquelle</b>	<a href="http://dx.doi.org/10.2355/isijinternational.ISIJINT-2015-714">http://dx.doi.org/10.2355/isijinternational.ISIJINT-2015-714</a>
<b>Deskriptoren</b>	STAHLHERSTELLUNG; SEKUNDÄRMETALLURGIE; RH-VERFAHREN; VAKUUMENTGASUNG; PFANNENBEHANDLUNG; MODELLSIMULATION; MODELLVERSUCH; NUMERISCHE STRÖMUNGSSIMULATION; MATHEMATISCHES MODELL; STRÖMUNGSDYNAMIK; STRÖMUNGSMUSTER; MISCHZEIT; Wassermodell
<b>Standort</b>	VDEh Zb 639(ISIJ)
<b>DB-Objekt-Nr.</b>	789464 (LS2 2016 22 22)

## 2.7 Sekundärmetallurgie

<b>Schlagwörter</b>	<b>PFANNENBEHANDLUNG; BLASENSÄULE; HYDRODYNAMIK; MODELLSIMULATION</b>
<b>Titel deutsch</b>	Einfaches mathematisches Modell zur Untersuchung der Hydrodynamik der Blasensäule in metallurgischen Pfannen
<b>Titel original</b>	<b>A simple mathematical model for estimating plume hydrodynamics of metallurgical ladles</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	<p>In secondary steelmaking, the refining operation is typically carried out in a metallurgical ladle that is commonly furnished with gas injection facilities. Since gas injection plays an intrinsic role in determining the efficiency of secondary steelmaking and thus the quality of final products, a great volume of work has been conducted mostly utilizing air-water systems at room temperature. Despite a portion of the air-water correlations have been adopted in the literature, their applicability to the real argon-metal system is still questionable. The main motivation behind this paper is to present a simple mathematical model for plume hydrodynamics of metallurgical ladles based on the characteristic phenomena and underlying mechanisms of a buoyant plume, where bubble breakup and coalescence occur simultaneously. The main assumptions/simplifications and governing equations are firstly introduced. After that, the accuracy of the model is demonstrated by comparing predicted plume velocities with the ones measured in an industrial ladle. The advantage of the present model over the air-water correlations has been fairly demonstrated by comparing predicted plume velocities with the ones measured in an industrial ladle. As the model provides a fundamental framework for further development, more capabilities, e.g gas purging for both hydrogen and nitrogen, slag-metal reaction for desulfurization and bubble dynamics under elevated and reduced pressures, will be considered. Also, the various versatilities of the model will be verified by both experimental work in laboratory and industrial trials.</p>
<b>Autor(en)</b>	Yu, Shan; Zou, Zong-shu; Shao, Lei; Louhenkilpi, Seppo
<b>Institution(en)</b>	Northeastern University, Shenyang, CN; Aalto University, Espoo, FI
<b>Quelle</b>	ISIJ International
<b>Band/Jahrgang</b>	56
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	7
<b>Seiten von-bis</b>	S.1303-1305
<b>S/Bild/Tab/Qu</b>	3S,3B,13Q
<b>Bezugsquelle</b>	<a href="http://dx.doi.org/10.2355/isijinternational.ISIJINT-2016-035">http://dx.doi.org/10.2355/isijinternational.ISIJINT-2016-035</a>
<b>Deskriptoren</b>	PFANNENBEHANDLUNG; SEKUNDÄRMETALLURGIE; ARGONSPÜLEN; BLASENSÄULE; HYDRODYNAMIK; MODELLSIMULATION; MATHEMATISCHES MODELL; INERTGASEINBLASEN; INERTGASBEWEGEN;
<b>Standort</b>	VDEh Zb 639(ISIJ)
<b>DB-Objekt-Nr.</b>	789483 (LS2 2016 22 23)



## 2.7 Sekundärmetallurgie

<b>Schlagwörter</b>	<b>STAHLDESOXIDATION; CALCIUMBEHANDLUNG; EINSCHLUSSMODIFIZIERUNG</b>
<b>Titel deutsch</b>	Kontrolle der Einschlusszusammensetzung in calciumbehandelten Al-beruhigten Stählen
<b>Titel original</b>	<b>Control of inclusion composition in calcium treated aluminum killed steels</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	Inclusions in slab samples with various total calcium, oxygen and sulfur content were investigated in low carbon aluminum killed steel (LCAK steel) with low sulfur content based on industrial experiments and the relationship between steel and inclusions was studied by analyzing inclusions characteristic being detected by SEM-EDS. It is found that T.Ca/T.O could better replace dissolved Ca to evaluate the extent of modification of alumina inclusions by Ca. Inclusions changed from Al <sub>2</sub> O <sub>3</sub> based inclusions to Al <sub>2</sub> O <sub>3</sub> -CaS inclusions and finally to CaO-CaS inclusions with the increase of T.Ca/T.O in steel for slab samples and MgO and Al <sub>2</sub> O <sub>3</sub> content in inclusions almost linearly decreased with T.Ca/T.O in steel. Increasing T.Ca/S in steel could improve the modification extent of alumina by Ca further increased CaS content of inclusions for slab samples with Al <sub>2</sub> O <sub>3</sub> -CaS inclusions. In addition, the formation mechanism of inclusions including Al <sub>2</sub> O <sub>3</sub> based inclusions, Al <sub>2</sub> O <sub>3</sub> -CaS inclusions and CaO-CaS inclusions was discussed.
<b>Autor(en)</b>	Zhao, Dongwei; Li, Haibo; Cui, Yang; Yang, Jian
<b>Institution(en)</b>	Shougang Research Institute of Technology, Beijing, CN; Qian'an Iron & Steel, CN
<b>Quelle</b>	ISIJ International
<b>Band/Jahrgang</b>	56
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	7
<b>Seiten von-bis</b>	S.1181-1187
<b>S/Bild/Tab/Qu</b>	7S,8B,5T,12Q
<b>Bezugsquelle</b>	<a href="http://dx.doi.org/10.2355/isijinternational.ISIJINT-2016-123">http://dx.doi.org/10.2355/isijinternational.ISIJINT-2016-123</a>
<b>Deskriptoren</b>	STAHLHERSTELLUNG; STAHLDESOXIDATION; SEKUNDÄRMETALLURGIE; ALUMINIUMBERUHIGTER STAHL; CALCIUMZUSATZ; OXIDEINSCHLUSS; SULFIDEINSCHLUSS; ALUMINIUMOXID; CALCIUMSULFID; BRAMMENGIEßEN; Calciumbehandlung
<b>Standort</b>	VDEh Zb 639(ISIJ)
<b>DB-Objekt-Nr.</b>	789482 (LS2 2016 22 24)

## 2.7 Sekundärmetallurgie

<b>Schlagwörter</b>	<b>RH-ANLAGE; RÜSSEL; FEUERFESTER BETON; HALTBARKEIT</b>
<b>Titel deutsch</b>	Zur Haltbarkeit von feuerfesten Betonen für das untere Ende des RH-Rüssels
<b>Titel original</b>	<b>Durability of Castable of Lower End of RH Snorkel</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	<p>The exchange factor of vacuum degassing processing container of RH (RH Snorkel) is varies a lot according to materials, such as lining bricks, castable and steel. Especially deterioration of the lower end castable from abrasion and crack is severe; that is a main exchange factor of RH Snorkel. The structure of the lower end of RH Snorkel is composed of materials having different properties, and it is believed that the structural factors have a significant impact on the durability of refractory. In a former report, influence of deformation of steel was studied and it became clear that measures in the structure of steel inhibit cracks in the castables. Therefore the authors studied how distance X between lower end of steel and lower end of castable and stud diameter influence on cracks of the castable and how allocation of the stud in the lower end of bricks influences on boundary dissolution between the bricks and castable.</p>
<b>Autor(en)</b>	Hra, Daisuke; Terada, Shogo; Murakami, Yuichiro; Koide, Kunihiko; Soeda, Tomomi
<b>Institution(en)</b>	TYK, Tajimi-shi, Gifu, JP
<b>Quelle</b>	Journal of the Technical Association of Refractories, Japan
<b>Band/Jahrgang</b>	36
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	2
<b>Seiten von-bis</b>	S.80-85
<b>S/Bild/Tab/Qu</b>	5S,5B,9T,2Q
<b>Deskriptoren</b>	RH-VERFAHREN; FEUERFESTER BETON; LABORUNTERSUCHUNG; VERSUCHSBESCHREIBUNG; VERSUCHSAUFBAU; RISSBILDUNG; FEUERFESTER STEIN; DURCHMESSER; TAUCHVERSUCH; EROSION; ANKER (BAUWESEN); Rüssel
<b>Standort</b>	VDEh P.5.1262
<b>DB-Objekt-Nr.</b>	789498 (LS2 2016 22 25)

## 2.7 Sekundärmetallurgie

<b>Schlagwörter</b>	<b>HOCHFESTES BAUSTAHLBLECH; WASSERSTOFFAUFNAHME; WASSERSTOFFINDUZIERTER RISSE</b>
<b>Titel deutsch</b>	Die Verbesserung der inneren Qualität von hochfesten Baustahlplatten
<b>Titel original</b>	<b>The Improvement of Inner Quality of High-Strength Structural Plates</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	High-strength structural plates applied to bridges or skyscrapers usually bear large loading that the inner quality is critical to security. In China Steel Corporation (CSC), ultra-sonic test (UT) is used to ensure the inner quality of plates. The major internal defects of plates are micro-cracks appeared in the thickness center which usually accompanied with needle shaped MnS and brittle texture (Martensite). The forming mechanism of cracks are higher hydrogen content in liquid steel or hydrogen pick-up at the beginning of casting, more hydrogen atoms captured by hydrogen traps after solidification, redundant hydrogen atoms resulted in plates' inner hydrogen-induced cracks (HIC) due to insufficient diffusion after rolling. Several countermeasures were adopted, including increasing maintenance frequency of roller gap, limiting superheat and casting speed and proper diverting rules. On the other hand, RH vacuum efficiency and snorkel status were reviewed severely to ensure lower hydrogen content in liquid steel. After the implementation of above countermeasures, the rejects from ultra-sonic test failures decreased to 1 /3 of original, and significantly reduced the rejects cost and shortened the delivery time.
<b>Autor(en)</b>	Wang, Chao-yun; Wu, Chun-hung
<b>Institution(en)</b>	CSC Steel, Kaohsiung, TW
<b>Quelle</b>	SEASI Quarterly Journal (SQJ)
<b>Verlag</b>	SEASI
<b>Band/Jahrgang</b>	45
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	1
<b>Seiten von-bis</b>	S.44-47
<b>S/Bild/Tab/Qu</b>	4S,8B,1T,6Q
<b>Deskriptoren</b>	HOCHFESTER STAHL; WASSERSTOFFAUFNAHME; WASSERSTOFFVERSPRÖDUNG; WASSERSTOFFINDUZIERTER RISSBILDUNG; VAKUUMBEHANDLUNG; GIEßTEMPERATUR; ERSTARRUNG; SEIGERUNG; GEFÜGEOPTIMIERUNG;
<b>Standort</b>	VDEh P5.1039
<b>DB-Objekt-Nr.</b>	789505 (LS2 2016 22 26)

## 2.7 Sekundärmetallurgie

<b>Schlagwörter</b>	<b>STAHLDESOXIDATION; TITANZUSATZ; EINSCHLUSSMODIFIZIERUNG; MAGNESIUMZUSATZ</b>
<b>Titel deutsch</b>	Einfluss von Mg auf das Verhalten und die Teilchengröße der Einschlüsse in schmelzflüssigen Al-Ti-beruhigten Stählen
<b>Titel original</b>	<b>Effect of Mg on behavior and particle size of inclusions in Al-Ti deoxidized molten steels</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	To investigate the effect of magnesium addition on the evolution of inclusions in Al-Ti deoxidized melts, both thermodynamic calculations and deoxidized experiments were carried out in the present work. The samples took from the melts were polished and analyzed by field scanning electron microscopy (FE-SEM) and energy dispersive spectroscopy (EDX). The results showed that the addition of magnesium significantly influenced the size of oxide inclusions in Al-Ti deoxidized melts. Superfluous MgO raised the melting point of these complex inclusions, and then degraded the steel castability. Therefore, the amount of magnesium addition should be carefully controlled. Based on thermodynamic calculations and experimental results, the recommended range of Mg is 1-5 ppm. All inclusions observed in the sample were nearly spherical except for solid titanium aluminate inclusions. Oxide inclusions were modified quickly after magnesium addition. Meanwhile, magnesium could also modify solid titanium aluminate inclusions in the melts similarly, but there were unreacted cores in the inclusions at the initial stage. The evolution mechanisms of inclusions were comprehensively discussed, and models for the formation of oxide inclusions were set up. As for the production practice, the addition amount of magnesium and titanium should be considered simultaneously to liquefy inclusions in molten steel.
<b>Autor(en)</b>	Zhang, Tongsheng; Liu, Chengjun; Jiang, Maofa
<b>Institution(en)</b>	Northeastern University, Shenyang, CN; Carnegie Mellon University, Pittsburgh, PA, US
<b>Quelle</b>	Metallurgical and Materials Transactions B, Process Metallurgy and Materials Processing Science
<b>Band/Jahrgang</b>	47B
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	4
<b>Seiten von-bis</b>	S.2253-2262
<b>S/Bild/Tab/Qu</b>	10S,8B,4T,61Q
<b>Bezugsquelle</b>	<a href="http://dx.doi.org/10.1007/s11663-016-0706-x">http://dx.doi.org/10.1007/s11663-016-0706-x</a>
<b>Deskriptoren</b>	STAHLDESOXIDATION; ALUMINIUMBERUHIGTER STAHL; OXIDEINSCHLUSS; TITANZUSATZ; MAGNESIUMZUSATZ; QUANTITATIVE EINSCHLUSSBESTIMMUNG; TITANOXID; TEILCHENGRÖßENVERTEILUNG; THERMODYNAMIK; THERMODYNAMISCHE ANALYSE; PARTIKELMORPHOLOGIE; MAGNESIUMALUMINIUMSPINELL; TITANALUMINAT; Einschlussmodifizierung
<b>Standort</b>	VDEh P.5.497(Met.trans.B)
<b>DB-Objekt-Nr.</b>	789574 (LS2 2016 22 27)

## 2.7 Sekundärmetallurgie

### Schlagwörter

**PFANNENBEHANDLUNG; PROZESSÜBERWACHUNG; VIBRATIONSSIGNAL;  
MULTIVARIATE ANALYSE**

### Titel deutsch

Multivariate Analyse der Pfannenvibration

### Titel original

**Multivariate analysis of ladle vibration**

### Dokumentart

Zeitschriftenaufsatz

### Sprache(n)

Englisch

### Abstract

The homogeneity of composition and uniformity of temperature of the steel melt before it is transferred to the tundish are crucial in making high-quality steel product. The homogenization process is performed by stirring the melt using inert gas in ladles. Continuous monitoring of this process is important to make sure the action of stirring is constant throughout the ladle. Currently, the stirring process is monitored by process operators who largely rely on visual and acoustic phenomena from the ladle. However, due to lack of measurable signals, the accuracy and suitability of this manual monitoring are problematic. The actual flow of argon gas to the ladle may not be same as the flow gage reading due to leakage along the gas line components. As a result, the actual degree of stirring may not be correctly known. Various researchers have used one-dimensional vibration, and sound and image signals measured from the ladle to predict the degree of stirring inside. They developed online sensors which are indeed to monitor the online stirring phenomena. In this investigation, triaxial vibration signals have been measured from a cold water model which is a model of an industrial ladle. Three flow rate ranges and varying bath heights were used to collect vibration signals. The Fast Fourier Transform was applied to the dataset before it has been analyzed using principal component analysis (PCA) and partial least squares (PLS). PCA was used to unveil the structure in the experimental data. PLS was mainly applied to predict the stirring from the vibration response. It was found that for each flow rate range considered in this study, the informative signals reside in different frequency ranges. The first latent variables in these frequency ranges explain more than 95 pct of the variation in the stirring process for the entire single layer and the double layer data collected from the cold model. PLS analysis in these identified frequency ranges demonstrated that the latent variables of the response and predictor variables are highly correlated. The predicted variable has shown linear relationship with the stirring energy and bath recirculation speed. This outcome can improve the predictability of the mixing status in ladle metallurgy and make the online control of the process easier. Industrial testing of this input will follow.

### Autor(en)

Yenus, Jaefer; Brooks, Geoffrey; Dunn, Michelle

### Institution(en)

Swinburne University of Technology, Hawthorn, VIC, AU

### Quelle

Metallurgical and Materials Transactions B, Process Metallurgy and Materials Processing Science

### Band/Jahrgang

47B

### Erscheinungsjahr

2016

### Heft/Monat

4

### Seiten von-bis

S.2681-2689

### S/Bild/Tab/Qu

9S,13B,4T,45Q

### Bezugsquelle

<http://dx.doi.org/10.1007/s11663-016-0707-9>

### Deskriptoren

PFANNENBEHANDLUNG; SEKUNDÄRMETALLURGIE; GIEßPFANNE; MESSEN  
MECHANISCHER SCHWINGUNGEN; SCHWINGUNGSANALYSE; INERTGASBEWEGEN;  
INERTGASEINBLASEN; ARGONSPÜLEN; MODELLVERSUCH; SCHWINGUNGSSENSOR  
(MECHANISCH); Wassermodell

### Standort

VDEh P.5.497(Met.trans.B)

### DB-Objekt-Nr.

789606

(LS2 2016 22 28)

## 2.8 Umschmelzverfahren

<b>Schlagwörter</b>	<b>ELEKTROSchLACKEUMSchMELZVERFAHREN; SELTENE ERDEN; HOCHWARMFESTE LEGIERUNG; THERMODYNAMISCHE BERECHNUNG</b>
<b>Titel deutsch</b>	Zum Ausbringen von Y, La und Ce in Hochtemperaturlegierungen während des Elektroschlackeumschmelzprozesses
<b>Titel original</b>	<b>Yield of Y, LA, Ce in high temperature alloy during electroslag remelting process</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	In the current study, samples of ingots and slags after electro slag remelting (ESR) were analysed to investigate the re-oxidation of the rare earth (Re) metals Y, La and Ce from high temperature alloys during remelting. The yield of Y, La and Ce in high temperature alloys during ESR is enhanced by increasing the concentrations of their oxides in the slag, and by adding CaO to the slag. Alumina in the slag should be avoided during ESR, since Y, La and Ce are easily oxidized by Al <sub>2</sub> O <sub>3</sub> , and because Al <sub>2</sub> O <sub>3</sub> lowers the activity of the rare-earth element oxides. The effect of Re <sub>2</sub> O <sub>3</sub> , CaO and Al <sub>2</sub> O <sub>3</sub> content in the slag on the activity of Re <sub>2</sub> O <sub>3</sub> was estimated using the Temkin model.
<b>Autor(en)</b>	Ren, Ying; Zhang, Lifeng; Yu, Le; Fang, Wen
<b>Institution(en)</b>	School of Metallurgical and Ecological Engineering, University of Science and Technology Beijing, CN; Center for Iron and Steelmaking Research, Department of Material Science and Engineeringm Carnegie Mellon University, Pittsburgh, PA, US; Ironmaking Plant, Wuhan Iron and Steel, Wuhan, CN
<b>Quelle</b>	Metallurgical Research & Technology
<b>Band/Jahrgang</b>	113
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	4
<b>Seiten von-bis</b>	S.1-9
<b>S/Bild/Tab/Qu</b>	9S,10B,6T,47Q
<b>Bezugsquelle</b>	<a href="http://dx.doi.org/10.1051/metal/2016017">http://dx.doi.org/10.1051/metal/2016017</a>
<b>Deskriptoren</b>	ELEKTROSchLACKEUMSchMELZEN; LEGIERUNG; YTTRIUM; LANTHAN; CAESIUM; AUSBRINGEN; HOCHTEMPERATURLEGIERUNG; LABORUNTERSUCHUNG; VERSUCHSBESCHREIBUNG; SchLACKE; SchLACKENANALYSE; CHEMISCHE ZUSAMMENSETZUNG; THERMODYNAMISCHE EIGENSCHAFT; THERMODYNAMISCHES MODELL; PHASENDIAGRAMM;
<b>Standort</b>	VDEh Zb 383
<b>DB-Objekt-Nr.</b>	789691 (LS2 2016 22 29)

## 2.9 Stranggießen

### Schlagwörter

**STRANGGIESSEN; KOHLENSTOFFARMER STAHL; NUMERISCHE SIMULATION; PROZESSOPTIMIERUNG**

### Titel deutsch

Verbesserung des Gießens von Sonderstählen mit einer großen Fest-Flüssig-Grenzfläche

### Titel original

**Improvement of the casting of special steel with a wide solid-liquid interface**

### Dokumentart

Zeitschriftenaufsatz

### Sprache(n)

Englisch

### Abstract

In the last few years, steelmakers have been facing a significant decrease in the steel demand caused by the global economic crisis. Positive economic results have mostly been reached in the steel factories that have focused on special steel production with higher product capabilities, such as higher strength grades, steel design for acidic environments, steel for the offshore technology, etc. These steels must keep the mechanical properties, such as the resistance to rupture, compression strength, stress-strain properties, etc., within strict limits. The numerical calculations and optimization of casting parameters were provided. The results show the recommended casting parameters and differences between the examined steel and classic low-carbon steels.

### Autor(en)

Mauder, Tomas; Stetina, Josef

### Institution(en)

Faculty of Mechanical Engineering, Brno University of Technology, CZ

### Quelle

Materiali in Tehnologije / Materials and technology

### Band/Jahrgang

50

### Erscheinungsjahr

2016

### Heft/Monat

1

### Seiten von-bis

S.3-6

### S/Bild/Tab/Qu

4S,11B,2T,9Q

### Bezugsquelle

<http://dx.doi.org/10.17222/mit.2014.122>

### Deskriptoren

KOHLENSTOFFARMER STAHL; CHEMISCHE ZUSAMMENSETZUNG; STRANGGIEßEN; PROZESSPARAMETER; THERMOPHYSIKALISCHE EIGENSCHAFT; NUMERISCHE SIMULATION; FUZZY-LOGIK; ALGORITHMUS; PROZESSOPTIMIERUNG; TEMPERATURVERTEILUNG; MECHANISCHE EIGENSCHAFT; SPANNUNGS-DEHNUNGS-VERHALTEN;

### Standort

VDEh P.5.1067

### DB-Objekt-Nr.

789456

(LS2 2016 22 30)

## 2.9 Stranggießen

### Schlagwörter

**STRANGGIESSEN; ELEKTROMAGNETISCHES BREMSSEN; ELEKTROMAGNETISCHES RÜHREN; MODELLIEREN**

### Titel deutsch

Ein Netzwerkmodell des elektromagnetischen Bremsens für das Stranggießen von Stahl

### Titel original

**A meshless model of electromagnetic braking for the continuous casting of steel**

### Dokumentart

Zeitschriftenaufsatz

### Sprache(n)

Englisch

### Abstract

The application of magnetohydrodynamics in the continuous casting of steel enables improved control of the quality of the strand. The most common applications are electromagnetic braking (EMBR) and electromagnetic stirring (EMS). The former slows the flow by applying a static magnetic field and thus improves the steel flow pattern, reduces the velocity and the turbulence of the flow, increases the cleanliness of the material, improves the surface quality and reduces the number of inclusions, whereas the latter stirs the flow by applying an alternating magnetic field and thus improves the quality of the strand, reduces the surface and subsurface defects, enhances the solidification and reduces the number of breakouts. In this contribution EMBR in a continuous-casting process is considered. The local radial basis function collocation method (LRBFCM) is used for the solution of coupled mass, energy, turbulent fluid flow, species and magnetic field equations. The explicit Euler time-stepping scheme and the collocation with multiquadrics radial basis functions on the five-noded overlapping influence domains are used to obtain the solution of the partial differential equations. The Abe-Kondoh-Nagano low Reynolds turbulence model is used to describe the turbulent fluid flow, whereas the fractional step method is used to solve the pressure- velocity coupling. The method has been thoroughly tested in several test cases. In the present article the influence of the application of electromagnetic braking on the macro-segregation in the continuous-casting process for carbon steel is presented.

### Autor(en)

Mramor, Katarina; Vertnik, Robert; Sarler, Bozidar

### Institution(en)

University of Nova Gorica, SI; Institute of Metals and Technology, Ljubljana, SI

### Quelle

Materiali in Tehnologije / Materials and technology

### Band/Jahrgang

49

### Erscheinungsjahr

2015

### Heft/Monat

6

### Seiten von-bis

S.961-967

### S/Bild/Tab/Qu

7S,14B,1T,21Q

### Bezugsquelle

<http://dx.doi.org/10.17222/mit.2015.084>

### Deskriptoren

KOHLNSTOFFREICHER STAHL; STRANGGIEßEN; MAGNETFELD;  
ELEKTROMAGNETISCHE BREMSE; RÜHRWERK; TURBULENTE STRÖMUNG;  
TEMPERATURVERTEILUNG; SEIGERUNG; WERKSTOFFEIGENSCHAFT; MODELLIERUNG;  
ERSTARRUNG; ZWEIDIMENSIONALES MODELL; MATHEMATISCHES MODELL;  
BERECHNUNG;  
VDEh P.5.1067  
789455  
(LS2 2016 22 31)

### Standort

### DB-Objekt-Nr.



## 2.9 Stranggießen

<b>Schlagwörter</b>	<b>STRANGGIESSEN; TAUCHAUSGUSSAUSGUSS; ZIRKONOXIDERZEUGNIS; KORROSION</b>
<b>Titel original</b>	<b>Corrosion of the refractory zirconia metering nozzle due to molten steel and slag</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	<p>This paper presents a study on the phase composition and microstructure changes of a sintered Mg-stabilized zirconia metering nozzle exposed to the corrosive effect of the molten steel and slag in a tundish for continuous casting for 30 h. A macroscopic observation of the corroded material showed cracks and two zones that were distinguished with respect to colour. An X-ray diffraction analysis showed that the dark layer was richer in stabilized ZrO<sub>2</sub> than the light layer. After the corrosion test, the nozzle had higher contents of MgO, SiO<sub>2</sub>, CaO, Al<sub>2</sub>O<sub>3</sub> and Fe<sub>2</sub>O<sub>3</sub> than the reference sample as evidenced by an X-ray fluorescence analysis. Moreover, during the corrosion process, liquid steel and slag infiltrated the zirconia material, which was confirmed with a SEM investigation. Along the hot face of the metering nozzle, the grains of zirconium oxide recrystallized with a high-temperature structure of ZrO<sub>2</sub> and dissolved MgO and CaO derived from the slag, stabilizing this phase.</p>
<b>Autor(en)</b>	Wisniewska, Klaudia; Madej, Dominika; Szczerba, Jacek
<b>Institution(en)</b>	AGH University of Science and Technology, Faculty of Materials Science and Ceramics, Department of Ceramics and Refractories, Krakow, PL
<b>Quelle</b>	Materiali in Tehnologije / Materials and technology
<b>Band/Jahrgang</b>	50
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	1
<b>Seiten von-bis</b>	S.29-32
<b>S/Bild/Tab/Qu</b>	4S,6B,5Q
<b>Bezugsquelle</b>	<a href="http://dx.doi.org/10.17222/mit.2014.188">http://dx.doi.org/10.17222/mit.2014.188</a>
<b>Deskriptoren</b>	STRANGGIEßEN; ZWISCHENPFANNE; AUSGUSS (GIEßPFANNE); FEUERFESTE AUSKLEIDUNG; FEUERFESTES ZIRKONOXIDERZEUGNIS; MIKROSTRUKTUR; KORROSION; KORROSION AN FEUERFESTERZEUGNISSEN; FLÜSSIGER STAHL; FLÜSSIGE SCHLACKE;
<b>Standort</b>	VDEh P.5.1067
<b>DB-Objekt-Nr.</b>	789463 (LS2 2016 22 32)

## 2.9 Stranggießen

<b>Schlagwörter</b>	<b>STRANGGIESSVERTEILER; EINSCHLUSSENTFERNUNG; MIKROBLASENSTRÖMUNG</b>
<b>Titel deutsch</b>	Entfernung von Einschlüssen durch Mikroblasenschwärme in einem 1:1-Wassermodell einer viersträngigen Verteilerrinne
<b>Titel original</b>	<b>Removal of inclusions using micro-bubble swarms in a four-strand, full-scale, water model tundish</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	Water model experiments were performed in a full-scale, delta-shaped water model tundish, in order to study the removal of inclusions by micro-bubbles. Micro-bubbles were generated using a specially designed ladle shroud with twelve laser-drilled orifices. Gas flow rates, injection positions and multi-port injection were all taken into consideration to create different bubble conditions. Bubbles were recorded using a high speed camera and post-processed with commercial software, Image J. Hollow glass borosilicate microspheres, smaller than 100 microns, were used to simulate inclusions, and detected, in-situ, using a new generation of the Aqueous Particle Sensor, APS III. The results revealed that the effect of micro-bubbles on inclusion removal depends greatly on the gas injection protocols used. The optimum gas flow rate was an intermediate value, which indicates a minimum particle number density, $n_p$ , of about 7.85 per ml. This results from the counter-balancing effects of bubble sizes against the total number of bubbles. The highest inclusion removal rate was 80%, when gas was injected through the four ports located closest to the slide gate, at a gas flow rate of 0.2 L/min. There is a clear correlation between gas injection position and its effect on inclusion removal, the closer the injection port to the slide gate was, the better it performed in removing inclusions. Multi-port gas injection is an effective method to promote the inclusion removal, as it dramatically reduces the gas flow rate to each port, while keeping the total gas flow rate constant. Certainly, increasing the port number is beneficial for inclusion removal. Under a given method of gas injection, the optimum gas flow rate is an intermediate value, determined by balancing smaller bubble sizes against the total number of bubbles being created. Due to the lack of tundish flow controllers to enhance 'steel quality', one-fifth of micro- particles exit as a result of short circuiting flows, and could not be removed by micro-bubbles.
<b>Autor(en)</b>	Chang, Sheng; Cao, Xiangkun; Hsin, Cheng-Hung; Zou, Zongshu; Isac, Mihaiela; Guthrie, Roderick Ian Lawrence
<b>Institution(en)</b>	Northeastern University, Shenyang, CN; McGill University, Montreal, QC, CA
<b>Quelle</b>	ISIJ International
<b>Band/Jahrgang</b>	56
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	7
<b>Seiten von-bis</b>	S.1188-1197
<b>S/Bild/Tab/Qu</b>	10S,17B,5T,42Q
<b>Bezugsquelle</b>	<a href="http://dx.doi.org/10.2355/isijinternational.ISIJINT-2016-077">http://dx.doi.org/10.2355/isijinternational.ISIJINT-2016-077</a>
<b>Deskriptoren</b>	STRANGGIEßANLAGE; STRANGGIEßEN; ZWISCHENPFANNE; BLASENSCHWARM; MODELLVERSUCH; MODELLSIMULATION; AUFSTEIGEN VON EINSCHLÜSSEN; REINHEITSGRAD; NICHTMETALLISCHER EINSCHLUSS; MIKROBLASE; Wassermodell
<b>Standort</b>	VDEh Zb 639(ISIJ)
<b>DB-Objekt-Nr.</b>	789485 (LS2 2016 22 33)

## 2.9 Stranggießen

### Schlagwörter

**BRAMMENSTRANGGIESSEN; PERITEKTISCHER STAHL; GIESSPULVER**

### Titel deutsch

Anwendung hochbasischer Gießpulver zum Stranggießen großer Stahlbrammen

### Titel original

**Application of high-basicity mould fluxes for continuous casting of large steel slabs**

### Dokumentart

Zeitschriftenaufsatz

### Sprache(n)

Englisch

### Abstract

Controlling the formation of longitudinal cracks on hypo-peritectic steel slab surfaces is one of the key challenges in continuous casting worldwide. Based on the production in Chongqing Iron & Steel, mould fluxes with high basicity ranging from 1.7 to 1.8 were put forward and the effects of compositions on the basic properties of mould flux were studied in the present paper. After laboratory experiments, a high-basicity mould flux with an increased crystallisation speed to abate the heat-transfer capability in the meniscus area was fully applied in the first steelmaking plant of Chongqing Iron & Steel. Using the high-basicity mould flux, for more than 3 million tonnes of slab production, the large longitudinal crack was eliminated and the rate of formation of small longitudinal cracks decreased greatly. During the production process, sticking that impedes the smooth running of continuous casting was infrequent, and the spot check for longitudinal cracks on micro alloy steel surface was simplified in the slab finishing process. Furthermore, since the application effect of mass production is remarkable, the hot charging process is better implemented, and the contract can be accomplished in time. In summary, the problem of longitudinal cracks on hypo-peritectic steel slab surfaces is finally resolved and the high-basicity mould fluxes have become indispensable auxiliary materials during continuous casting of hypo-peritectic steel.

### Autor(en)

He, Y.-M.; Wang, Q.; Hu, B.; Zhu, L.-L.; Chen, W.-M.; He, S.-P.

### Institution(en)

Chongqing University, CN

### Quelle

Ironmaking and Steelmaking

### Band/Jahrgang

43

### Erscheinungsjahr

2016

### Heft/Monat

8

### Seiten von-bis

S.588-593

### S/Bild/Tab/Qu

6S,5B,6T,23Q

### Bezugsquelle

<http://dx.doi.org/10.1080/03019233.2016.1139224>

### Deskriptoren

STRANGGIEßEN; BRAMMENGIEßEN; GIEßPULVER; BASISITÄT (METALLURGIE); PERITEKTISCHE UMWANDLUNG; KOHLENSTOFFARMER STAHL; ERSTARRUNGSRISS; LITHIUMOXID; NATRIUMOXID; WÄRMEÜBERTRAGUNG; CHEMISCHE ZUSAMMENSETZUNG; OBERFLÄCHENRISS;

### Standort

VDEh P.5.1082

### DB-Objekt-Nr.

789514

(LS2 2016 22 34)

## 2.9 Stranggießen

<b>Schlagwörter</b>	<b>BRAMMENSTRANGGIESSEN; FLUORFREIES GIESSPULVER; BETRIEBSVERSUCH</b>
<b>Titel deutsch</b>	F-freie Gießpulver zum Brammengießen aus kohlenstoffarmen Stählen - technologische Parameter und industrielle Versuche
<b>Titel original</b>	<b>F-free mould powders for low carbon steel slab casting - technological parameters and industrial trials</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	<p>The choice of the mould powder for slab casting is a difficult task because mould powders have many important functions during the continuous casting of steel. CaF<sub>2</sub> is a key ingredient in conventional mould slags since it reduces the viscosity, the liquidus temperature and the break temperature. Fluorine in mould powders is undesirable from the environmental and health points of view due to the following reasons: (i) evolves easily from slags, producing health-injurious gaseous substances, such as hydrofluoric acid; (ii) creates problems for storage and utilisation of solid waste and (iii) causes machinery corrosion. Aim of the present work is to describe the development of a new F-free mould powder for low carbon steel slab casting replacing CaF<sub>2</sub> with B<sub>2</sub>O<sub>3</sub>. Laboratory tests and industrial trials were performed considering the technological parameters viscosity, break temperature and crystallisation tendency. From laboratory tests it was concluded that important technological parameters are similar when comparing the F-bearing mould powder (reference) and the new F-free B-bearing mould powder for low carbon steel slab casting: viscosity at 1300 deg C, break temperature, and crystallisation tendency. It was observed during industrial trials that a significant decrease of the submerged entry nozzle erosion was observed. The results were similar when comparing the F-bearing and the F-free performance: slag pool thickness measurements, melting behaviour, Al<sub>2</sub>O<sub>3</sub> absorption, mould powder consumption and slabs superficial quality.</p>
<b>Autor(en)</b>	Klug, J.L.; Pereira, M.M.S.M.; Nohara, E.L.; Freitas, S.L.; Ferreira, G.T.; Jung, D.
<b>Institution(en)</b>	Universidade Federal do Ceara, Fortaleza, BR; IMERYS Steelcasting do Brasil, Guaratingueta, BR; Universidade de Taubate, BR
<b>Quelle</b>	Ironmaking and Steelmaking
<b>Band/Jahrgang</b>	43
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	8
<b>Seiten von-bis</b>	S.559-563
<b>S/Bild/Tab/Qu</b>	5S,2B,4T,19Q
<b>Bezugsquelle</b>	<a href="http://dx.doi.org/10.1080/03019233.2016.1213026">http://dx.doi.org/10.1080/03019233.2016.1213026</a>
<b>Deskriptoren</b>	STRANGGIEßEN; BRAMMENGIEßEN; GIEßPULVER; KOKILLE; CHEMISCHE ZUSAMMENSETZUNG; BOROXID; OXIDEINSCHLUSS; VISKOSITÄT; SCHMELZVERHALTEN; KRISTALLINITÄT; fluorfreies Gießpulver
<b>Standort</b>	VDEh P.5.1082
<b>DB-Objekt-Nr.</b>	789510 (LS2 2016 22 35)

## 2.9 Stranggießen

### Schlagwörter

**STRANGGIESSVERTEILER; PROZESSOPTIMIERUNG; ÜBERSICHT**

### Titel deutsch

Tundish-Technologie zum Gießen von sauberem Stahl: eine Übersicht

### Titel original

**Tundish technology for casting clean steel: a review**

### Dokumentart

Zeitschriftenaufsatz

### Sprache(n)

Englisch

### Abstract

With increasing demand of high-quality clean steel, cleanliness is of paramount importance in steel production and casting. Tundish plays an important role in controlling the continuously cast steel quality as it links a batch vessel, ladle, to a continuous casting mold. Tundish is also the last vessel in which metal flows before solidifying in mold. For controlling the quality of steel, flow and temperature control of the melt are critical, and these are presented in this paper. Use of proper flux, design of flow control devices, and gas injection in tundish become important factors in casting clean steel. Recycling of hot tundish, centrifugal flow tundish, H-shaped tundish, etc, are some of the developments which were implemented to cast clean steel and these are discussed in this paper. For cleaner steel casting, the following aspects are considered important: 1) Melt reoxidation by oxygen in air or by oxidizing slag should be prevented or minimized during its flow from tundish to mold; 2) The ladle-to-tundish metal stream should have in a long nozzle or enclosed in a ceramic shrouding pipe with Ar gas injection; 3) Slag transfer from the ladle to the tundish and from the tundish to the mold should be prevented by slag sensing and transfer prevention technologies; 4) A larger and deeper tundish with a covered top lid filled with argon gas atmosphere or covered by tundish flux should be used; 5) Calcium alloy addition helps in inclusion modification; 6) Use of flow control devices depending upon the situation may provide the desired melt flow; 7) Proper melt temperature control by induction or plasma heating produced high-quality steel; 8) Hot tundish recycling reduces refractory cost, saves energy, and casts cleaner steel; and 9) H-shaped tundish and centrifugal tundish are two novel technologies for casting high-quality steel.

### Autor(en)

Sahai, Yogeshwar

### Institution(en)

Ohio State University, Columbus, OH, US

### Quelle

Metallurgical and Materials Transactions B, Process Metallurgy and Materials Processing Science

### Band/Jahrgang

47B

### Erscheinungsjahr

2016

### Heft/Monat

4

### Seiten von-bis

S.2095-2106

### S/Bild/Tab/Qu

12S,25B,43Q

### Bezugsquelle

<http://dx.doi.org/10.1007/s11663-016-0648-3>

### Deskriptoren

STRANGGIEßANLAGE; STRANGGIEßEN; ZWISCHENPFANNE; PROZESSENTWICKLUNG; PROZESSOPTIMIERUNG; STRÖMUNGSMUSTER; ÜBERSICHT; STAND DER TECHNIK; TECHNISCHE ENTWICKLUNG; STRÖMUNGSLEITVORRICHTUNG; INERTGASEINBLASEN; AUFSTEIGEN VON EINSCHLÜSSEN; Calciumbehandlung

### Standort

VDEh P.5.497(Met.trans.B)

### DB-Objekt-Nr.

789560

(LS2 2016 22 36)

## 2.9 Stranggießen

<b>Schlagwörter</b>	<b>BRAMMENGIESSEN; GIESSPULVER; KRISTALLMORPHOLOGIE</b>
<b>Titel deutsch</b>	Kontrolle der Kristallmorphologie von Gießpulver im Laufe des Stranggießprozesses von hochfesten Mehrphasenstählen
<b>Titel original</b>	<b>Control of crystal morphology for mold flux during high-aluminum AHSS continuous casting process</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	<p>In the present manuscript, the efforts to control the crystal morphology are carried out aiming at improving the lubrication of lime-alumina-based mold flux for casting advanced high-strength steel with high aluminum. Jackson alpha factors for crystals of melt crystallization in multi-component mold fluxes are established and reasonably evaluated by applying thermodynamic databases to understand the crystal morphology control both in lime-alumina-based and lime-silica-based mold fluxes. The results show that Jackson alpha factor and supercooling are the most critical factors to determine the crystal morphology in a mold flux. Crystals precipitating in mold fluxes appear with different morphologies due to their different Jackson alpha factors and are likely to be more faceted with higher Jackson alpha factor. In addition, there is a critical supercooling degree for crystal morphology dendritic transition. When the supercooling over the critical value, the crystals transform from faceted shape to dendritic ones in morphology as the kinetic roughening occurs. Typically, the critical supercooling degrees for cuspidine dendritic transition in the lime-silica-based mold fluxes are evaluated to be between 0.05 and 0.06. Finally, addition of a small amount of Li<sub>2</sub>O in the mold flux can increase the Jackson alpha factor and decrease the supercooling for cuspidine precipitation; thus, it is favorable to enhance a faceted cuspidine crystal.</p>
<b>Autor(en)</b>	Guo, Jing; Seo, Myung-Duk; Shi, Cheng-Bin; Cho, Jung-Wook; Kim, Seon-Hyo
<b>Institution(en)</b>	Pohang University of Science and Technology (POSTECH), KR; Doosan Heavy Industries & Construction, Changwon, KR; University of Science and Technology Beijing (USTB), CN
<b>Quelle</b>	Metallurgical and Materials Transactions B, Process Metallurgy and Materials Processing Science
<b>Band/Jahrgang</b>	47B
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	4
<b>Seiten von-bis</b>	S.2211-2221
<b>S/Bild/Tab/Qu</b>	11S,7B,5T,41Q
<b>Bezugsquelle</b>	<a href="http://dx.doi.org/10.1007/s11663-016-0697-7">http://dx.doi.org/10.1007/s11663-016-0697-7</a>
<b>Deskriptoren</b>	STRANGGIEßEN; GIEßPULVER; KRISTALLISATIONSVERHALTEN; KRISTALLMORPHOLOGIE; KRISTALLWACHSTUM AUS DER SCHMELZE; TRIP-STAHL; ALUMINIUMOXID; UNTERKÜHLUNG; CALCIUMALUMINAT; Cuspidin
<b>Standort</b>	VDEh P.5.497(Met.trans.B)
<b>DB-Objekt-Nr.</b>	789570 (LS2 2016 22 37)

## 2.9 Stranggießen

<b>Schlagwörter</b>	<b>STRANGGIESSKOKILLE; RISSBILDUNG; MODELLSIMULATION</b>
<b>Titel deutsch</b>	Entwicklung eines Kokillenriss-simulators: Untersuchung zur Bildung von Durchbrüchen und Rissen in Stranggießkokillen
<b>Titel original</b>	<b>Development of a mold cracking simulator: the study of breakout and crack formation in continuous casting mold</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	Based on the mold simulator technology, a mold-cracking simulator has been successfully developed to study the process of breakout and the shell surface crack formation during the initial solidification of molten steel inside the continuous casting mold. First, a spheroidal protrusion was installed on the mold hot surface to mimic the abnormal force that generated by mold wall deformation, and then the external force was applied to the initial solidified shell, to facilitate the formation of breakout and shell surface cracks. Second, the responding temperature and heat flux across mold hot surface were recovered by an inverse heat conduction problem. The experimental results indicated that the mold breakout occurs around the shell tip by the combined efforts from external horizontal force, ferrostatic pressure, and thermal stresses during positive strip time. The breakout tends to introduce the peak of the responding temperature and heat flux across the mold hot surface. The vertical propagation velocity of the rupture point in the solidification shell has been calculated as 0.42 m/s in this study, which is in good agreement with industrial slabs. The paper also suggested that surface transverse crack formation is related to the segregation of sulfur during the initial solidification of molten steel.
<b>Autor(en)</b>	Zhang, Yexin; Wang, Wanlin; Zhang, Haihui
<b>Institution(en)</b>	Central South University, Changsha, CN
<b>Quelle</b>	Metallurgical and Materials Transactions B, Process Metallurgy and Materials Processing Science
<b>Band/Jahrgang</b>	47B
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	4
<b>Seiten von-bis</b>	S.2244-2252
<b>S/Bild/Tab/Qu</b>	9S,12B,2T,23Q
<b>Bezugsquelle</b>	<a href="http://dx.doi.org/10.1007/s11663-016-0705-y">http://dx.doi.org/10.1007/s11663-016-0705-y</a>
<b>Deskriptoren</b>	STRANGGIEßANLAGE; STRANGGIEßEN; KOKILLE; MODELLSIMULATION; MODELLVERSUCH; SIMULATIONSMODELL; WÄRMESTROMDICHTHE; WARMRISSAUSBILDUNG; Strangdurchbruch
<b>Standort</b>	VDEh P.5.497(Met.trans.B)
<b>DB-Objekt-Nr.</b>	789573 (LS2 2016 22 38)

## 2.9 Stranggießen

<b>Schlagwörter</b>	<b>FLUORFREIES GIESSPULVER; KRISTALLISATIONSVERHALTEN; NATRIUMOXIDEINFLUSS</b>
<b>Titel deutsch</b>	Kristallisationsverhalten und Wärmeübertragung von fluorfreien Gießpulvern mit unterschiedlicher Na <sub>2</sub> O-Konzentration
<b>Titel original</b>	<b>Crystallization behavior and heat transfer of fluorine-free mold fluxes with different Na<sub>2</sub>O concentration</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	<p>In this study, the crystallization behavior and heat transfer of CaO-SiO<sub>2</sub>-Na<sub>2</sub>O-B<sub>2</sub>O<sub>3</sub>-TiO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub>-MgO-Li<sub>2</sub>O fluorine-free mold fluxes with different Na<sub>2</sub>O contents (5 to 11 mass pct) were studied using single/double hot thermocouple technique (SHTT/DHTT) and infrared emitter technique (IET), respectively. Continuous cooling transformation (CCT) and time-temperature transformation (TTT) diagrams constructed using SHTT showed that crystallization temperature increased and incubation time shortened with the increase of Na<sub>2</sub>O concentration, indicating an enhanced crystallization tendency. The crystallization process of mold fluxes in the temperature field simulating the casting condition was also investigated using DHTT. X-ray diffraction (XRD) analysis of the quenched mold fluxes showed that the dominant phase changed from CaSiO<sub>3</sub> to Ca<sub>11</sub>Si<sub>4</sub>B<sub>2</sub>O<sub>22</sub> with the increasing concentration of Na<sub>2</sub>O. The heat transfer examined by IET showed that the increase of Na<sub>2</sub>O concentration reduced the responding heat flux when Na<sub>2</sub>O was lower than 9 mass pct but the further increase of Na<sub>2</sub>O to 11 mass pct enhanced the heat flux. The correlation between crystallinity and heat transfer was discussed in terms of crystallization tendency and crystal morphology.</p>
<b>Autor(en)</b>	Yang, Jian; Zhang, Jianqiang; Sasaki, Yasushi; Ostrovski, Oleg; Zhang, Chen; Cai, Dexiang; Kashiwaya, Yoshiaki
<b>Institution(en)</b>	University of New South Wales, Sydney, NSW, AU; Baosteel Group Research Institute, Shanghai, CN; Kyoto University, JP
<b>Quelle</b>	Metallurgical and Materials Transactions B, Process Metallurgy and Materials Processing Science
<b>Band/Jahrgang</b>	47B
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	4
<b>Seiten von-bis</b>	S.2447-2458
<b>S/Bild/Tab/Qu</b>	12S, 13B, 2T, 41Q
<b>Bezugsquelle</b>	<a href="http://dx.doi.org/10.1007/s11663-016-0715-9">http://dx.doi.org/10.1007/s11663-016-0715-9</a>
<b>Deskriptoren</b>	STRANGGIEßEN; GIEßPULVER; NATRIUMOXID; KRISTALLISATIONSVERHALTEN; WÄRMEÜBERTRAGUNG; KONZENTRATIONSEINFLUSS; FLÜSSIGE SCHLACKE; ZTUSCHAUBILD; KRISTALLINITÄT; fluorfreies Gießpulver; DHTT (Double Hot Thermocouple Technique); SHTT (Single Hot Thermocouple Technique)
<b>Standort</b>	VDEh P.5.497(Met.trans.B)
<b>DB-Objekt-Nr.</b>	789594 (LS2 2016 22 39)



## 2.9 Stranggießen

<b>Schlagwörter</b>	<b>STRANGGIESSVERTEILER; PFANNENWECHSEL; SCHLACKENEINSCHLUSS; STRÖMUNGSSIMULATION</b>
<b>Titel deutsch</b>	Modellierung der Mehrphasenströmungen in Bezug auf das Einschließen von Schlacke beim Pfannenwechsel
<b>Titel original</b>	<b>Multiphase flow modeling of slag entrainment during ladle change-over operation</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	<p>Steel transfer from the ladle to a single-strand tundish using a conventional ladle shroud (CLS), and a dissipative ladle shroud (DLS) is studied during the transient period of ladle change-over operation. Fluid velocities and fluid flow turbulence statistics during this unsteady operation were recorded by an ultrasound velocimetry probe in a 1/3 scale water–oil–air analog model (to emulate steel–slag–air system). Reynolds stress model and volume of fluid model allow the tracking of water–oil, water–air, and oil–air interfaces during this operation. When the liquid steel is delivered throughout a conventional ladle shroud at the moment to start the regain of the operational level, strong turbulent kinetic energy is developed producing instable multiphase flows forming a water–oil–air emulsion inducing air and oil entrapment into the liquid bath. The emulsification began with the entrapped oil from the start of the ladle change, this phenomenon increases its intensity during the whole operation due to the presence of a vortex formed in front of the ladle shroud which is the main responsible of dragging continuously slag into the tundish bath. Flow turbulence and the intensity of the emulsification decrease considerably due to an efficient dissipation of the turbulent kinetic energy employing the DLS instead of the CLS. In detail, the dissipative ladle shroud delivers a twisting jet with lower kinetic energy, due to energy dissipation, promoting a reduction of the entry velocities. This effect decreases considerably the amount of air and oil entrained at the starting time of the bath level recovering, diminishing the emulsification phenomenon from the start of the operation. Using the dissipative ladle shroud the vortex phenomenon during the ladle change-over is eradicated; therefore, the amount of entrapped slag is considerably lower and consequently the emulsification phenomenon is also reduced. Moreover, this velocity reduction also decreases the free surface velocity and directly reduces the critical velocity at the oil–water interface for oil dragging. The modeling results indicate that DLS is widely recommended to substitute flow control devices to improve the fluid dynamics of liquid steel during this transient operation.</p>
<b>Autor(en)</b>	Morales, Rodolfo D.; Garcia-Hernandez, Saul; Barreto, Jose de Jesus; Ceballos-Huerta, Ariana; Calderon-Ramos, Ismael; Gutierrez, Enif
<b>Institution(en)</b>	Instituto Politecnico Nacional-ESIQIE, Mexico City, MX; TecNM-Instituto Tecnológico de Morelia, MX; K&E Technologies, Mexico City, MX; Instituto Tecnológico de Lazaro Cardenas, MX; Universidad Autonoma de Coahuila, Monclova, MX
<b>Quelle</b>	Metallurgical and Materials Transactions B, Process Metallurgy and Materials Processing Science
<b>Band/Jahrgang</b>	47B
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	4
<b>Seiten von-bis</b>	S.2595-2606
<b>S/Bild/Tab/Qu</b>	12S,15B,1T,37Q
<b>Bezugsquelle</b>	<a href="http://dx.doi.org/10.1007/s11663-016-0663-4">http://dx.doi.org/10.1007/s11663-016-0663-4</a>
<b>Deskriptoren</b>	STRANGGIEßEN; STRANGGIEßANLAGE; ZWISCHENPFANNE; MEHRPHASENSTRÖMUNG; NUMERISCHE STRÖMUNGSSIMULATION; MODELLSIMULATION; MODELLVERSUCH; MATHEMATISCHES MODELL; SCHLACKENEINSCHLUSS; STRÖMUNGSMUSTER; Pfannenwechsel; Wassermodell
<b>Standort</b>	VDEh P.5.497(Met.trans.B)
<b>DB-Objekt-Nr.</b>	789601 (LS2 2016 22 40)

## 2.9 Stranggießen

### Schlagwörter

**SCHLEUDERSTRANGGUSS; STRÖMUNGSSIMULATION; EINSCHLUSSBEWEGUNG**

### Titel deutsch

Modellierung der Strömungen und der Einschlussbewegung in Schleuderstrangguss

### Titel original

**Modeling on fluid flow and inclusion motion in centrifugal continuous casting strands**

### Dokumentart

Zeitschriftenaufsatz

### Sprache(n)

Englisch

### Abstract

During the centrifugal continuous casting process, unreasonable casting parameters can cause violent level fluctuation, serious gas entrainment, and formation of frozen shell pieces at the meniscus. Thus, in the current study, a three-dimensional multiphase turbulent model was established to study the transport phenomena during centrifugal continuous casting process. The effects of nozzle position, casting and rotational speed on the flow pattern, centrifugal force acting on the molten steel, level fluctuation, gas entrainment, shear stress on mold wall, and motion of inclusions during centrifugal continuous casting process were investigated. Volume of Fluid model was used to simulate the molten steel-air two-phase. The level fluctuation and the gas entrainment during casting were calculated by user-developed subroutines. The trajectory of inclusions in the rotating system was calculated using the Lagrangian approach. The results show that during centrifugal continuous casting, a large amount of gas was entrained into the molten steel, and broken into bubbles of various sizes. The greater the distance to the mold wall, the smaller the centrifugal force. Rotation speed had the most important influence on the centrifugal force distribution at the side region. Angular moving angle of the nozzle with 8° and keeping the rotation speed with 60 revolutions per minute can somehow stabilize the level fluctuation. The increase of angular angle of nozzle from 8 to 18 deg and rotation speed from 40 to 80 revolutions per minute favored to decrease the total volume of entrained bubbles, while the increase of distance of nozzle moving left and casting speed had reverse effects. The trajectories of inclusions in the mold were irregular, and then rotated along the strand length. After penetrating a certain distance, the inclusions gradually moved to the center of billet and gathered there. More work, such as the heat transfer, the solidification, and the inclusions entrapment during centrifugal continuous casting, will be performed.

### Autor(en)

Wang, Qiangqiang; Zhang, Lifeng; Sridhar, Seetharaman

### Institution(en)

University of Science and Technology Beijing (USTB), CN; University of Warwick, Coventry, GB

### Quelle

Metallurgical and Materials Transactions B, Process Metallurgy and Materials Processing Science

### Band/Jahrgang

47B

### Erscheinungsjahr

2016

### Heft/Monat

4

### Seiten von-bis

S.2623-2642

### S/Bild/Tab/Qu

20S,29B,2T,50Q

### Bezugsquelle

<http://dx.doi.org/10.1007/s11663-016-0701-2>

### Deskriptoren

STRANGGIEßEN; SCHLEUDERGIEßVERFAHREN; SCHLEUDERGUSS; NICHTMETALLISCHER EINSCHLUSS; TEILCHENBEWEGUNG; STRÖMUNGSMUSTER; MODELLSIMULATION; MATHEMATISCHES MODELL; NUMERISCHE STRÖMUNGSSIMULATION; MEHRPHASENSTRÖMUNG; Schleuderstranggießen

### Standort

VDEh P.5.497(Met.trans.B)

### DB-Objekt-Nr.

789603

(LS2 2016 22 41)

## 2.10 Blockgießen

### Schlagwörter

**BLOCKGIESSEN; STAHLBLOCK; GIESSPARAMETER; SCHWINDUNGSPOROSITÄT**

### Titel deutsch

Einfluss der Gießparameter auf die Schwindungsporosität in einem Stahlblock von 19 Tonnen

### Titel original

**Influence of casting parameters on shrinkage porosity of a 19 ton steel ingot**

### Dokumentart

Zeitschriftenaufsatz

### Sprache(n)

Englisch

### Abstract

In order to improve metal yield during manufacture of steel ingots, influences of casting parameters on the shrinkage porosity of a 19 ton steel ingot were investigated by numerical simulation. A three-dimensional numerical model of filling and solidification of a 19 ton steel ingot was developed. The model was validated by method of infrared temperature surveying. Based on this model, a series of numerical experiments was carried out and the influences of casting parameters such as height-to-diameter ratio (H/D), taper height of insulation, pouring temperature and pouring rate on the depth of shrinkage cavity and the tightness in structure were investigated. Two dimensionless factors were proposed to help to evaluate the effect of these casting parameters on the shrinkage porosity. In which, the absolute difference of the maximum and minimum values of each parameter allowed in industrial process, the difference of the two values used in the simulation of each parameter and the difference of the depth of shrinkage cavities calculated under the smaller and larger values of each parameter were all taken into consideration. Results show that decreasing taper, pouring rate and H/D ratio, or increasing height of insulation can all reduce the depth of shrinkage cavity in the ingot effectively so as to improve the metal yield. While, pouring temperature almost has no influence on the depth of shrinkage cavity H/D ratio and pouring rate have significant negative correlations with density ratio of the ingot. On the contrary, taper has a positive correlation with density ratio of the ingot. Pouring temperature and height of insulation have few influences on the density ratio of the ingot. Decreasing H/D ratio and pouring rate within acceptable limits can reduce the depth of shrinkage cavity and increase the density ratio significantly.

### Autor(en)

Zhang, C.; Bao, Y.; Wang, M.

### Institution(en)

State Key Laboratory of Advanced Metallurgy, University of Science and Technology Beijing, CN

### Quelle

Metallurgia Italiana

### Band/Jahrgang

108

### Erscheinungsjahr

2016

### Heft/Monat

1

### Seiten von-bis

S.37-44

### S/Bild/Tab/Qu

8S,9B,4T,18Q

### Deskriptoren

BLOCKGUSS; STAHLBLOCK; CHEMISCHE ZUSAMMENSETZUNG; BLOCKGIEßEN; PROZESSPARAMETER; SCHRUMPFUNG; POROSITÄT; SCHWINDUNGSPRÜFUNG; URSACHE; NUMERISCHE SIMULATION; ERSTARREN; TEMPERATUR; HÖHENMESSUNG; ISOLATION; ABKÜHLUNGSKURVE;

### Standort

VDEh P.5.305

### DB-Objekt-Nr.

789673

(LS2 2016 22 42)

## 2.12 Sonstige Urformverfahren

<b>Schlagwörter</b>	<b>SPRÜHKOMPAKTIEREN; SCHNELLARBEITSSTAHL; MIKROSTRUKTUR; HÄRTE</b>
<b>Titel original</b>	<b>Preparation and Characterization of Spray Formed 2060 High Speed Steel</b>
<b>Dokumentart</b>	Tagungsbeitrag; Online Publikation
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	Spray forming has attracted considerable attention for the production of high speed steels due to its potential and priority in the microstructure refining and cost saving. In this study, high-quality large billets of 2060 high speed steel were successfully produced by spray forming process using a twin-atomizer facility. As-deposited billet was subsequently processed by hot forging, quenching in oil at 1180 deg C and a triple tempering in the temperature range of 500-580 deg C. The microstructures and hardness of the deposit and their subsequent development resulting from hot forging and heat treatment were investigated. This paper was designed to provide insight and have a better understanding of such a system for the steel. The results showed that the as-deposited microstructure was composed of the fine equiaxed grains with V-rich MC and W-Mo-rich M(ind 2)C carbides non-uniformly distributed along the grain boundaries and inside the grains. M(ind 2)C presented rod-like or unconnected net-shaped morphologies in the as-deposited microstructure. Following hot forging, metastable M(ind 2)C carbides were completely decomposed into refined MC and M(ind 6)C nearly spherical carbides uniformly distributed throughout the microstructure. A hardness value of 31HRC was attained for the spray deposited and hot forged samples. With increasing the tempering temperature, hardness was increased firstly and then decreased. Secondary hardening peak appeared at 540 deg C for spray formed 2060 steel austenitized at 1180 deg C, and the corresponding peak hardness reached 71HRC.
<b>Autor(en)</b>	Ni, Xin-Lei; Li, Zhou; Yuan, Hua; Xu, Wen-Yong; Zhang, Guo-Qing
<b>Institution(en)</b>	Beijing Institute of Aeronautical Materials (BIAM), CN
<b>Quelle</b>	Methods of Design and Characterization of Materials, Research and Development of Technological Processes, CMC 2015, Chinese Materials Congress, Selected, peer reviewed papers, Guiyang, CN, Jul 10-14, 2015 <b>in:</b> Materials Science Forum Zürich: Trans Tech Publications ( <a href="http://www.ttp.net">http://www.ttp.net</a> )
<b>Verlag</b>	850
<b>Band/Jahrgang</b>	2016
<b>Erscheinungsjahr</b>	S.603-609
<b>Seiten von-bis</b>	7S
<b>S/Bild/Tab/Qu</b>	<a href="http://dx.doi.org/10.4028/www.scientific.net/MSF.850.603">http://dx.doi.org/10.4028/www.scientific.net/MSF.850.603</a> ; <a href="http://www.scientific.net/MSF.850.603">http://www.scientific.net/MSF.850.603</a>
<b>Bezugsquelle</b>	SPRÜHKOMPAKTIEREN; HÄRTE; SCHNELLARBEITSSTAHL; MIKROGEFÜGE; CARBID;
<b>Deskriptoren</b>	WARMSCHMIEDEN; KOSTENEINSPARUNG; WÄRMEBEHANDLUNG; BETRIEBSANLAGE; ZERSTÄUBER; ÖLABSCHRECKEN; HOHE GESCHWINDIGKEIT; ANLASSTEMPERATUR; 788873
<b>DB-Objekt-Nr.</b>	(LS2 2016 22 43)

## 2.12 Sonstige Urformverfahren

### Schlagwörter

ADDITIVE FERTIGUNG; METALL; ANLAGENMODERNISIERUNG

### Titel original Dokumentart Sprache(n) Abstract

#### Accelerating Industrial Adoption of Metal Additive Manufacturing Technology

Zeitschriftenaufsatz

Englisch

While metal additive manufacturing (AM) technology has clear benefits, there are still factors preventing its adoption by industry. These factors include the high cost of metal AM systems, the difficulty for machinists to learn and operate metal AM machines, the long approval process for part qualification/certification, and the need for better process controls; however, the high AM system cost is the main barrier deterring adoption. In this paper, we will discuss an America Makes-funded program to reduce AM system cost by combining metal AM technology with conventional computerized numerical controlled (CNC) machine tools. Information will be provided on how an Optomec-led team retrofitted a legacy CNC vertical mill with laser engineered net shaping (LENS(R)-LENS is a registered trademark of Sandia National Labs) AM technology, dramatically lowering deployment cost. The upgraded system, dubbed LENS Hybrid Vertical Mill, enables metal additive and subtractive operations to be performed on the same machine tool and even on the same part. Information on the LENS Hybrid system architecture, learnings from initial system deployment and continuing development work will also be provided to help guide further development activities within the materials community.

### Autor(en) Institution(en) Quelle Band/Jahrgang Erscheinungsjahr Heft/Monat Seiten von-bis S/Bild/Tab/Qu Bezugsquelle Deskriptoren

Vartanian, Kenneth; McDonald, Tom

Optomec, Albuquerque, NM, US

JOM - The Journal of the Minerals, Metals and Materials Society

68

2016

3

S.806-810

5S,5Q

<http://dx.doi.org/10.1007/s11837-015-1794-9>

STÜCKKOSTEN; ADDITIVE FERTIGUNG; MASCHINENKOSTEN; ZERTIFIZIERUNG;  
WERKZEUGMASCHINE; ADDITIV; LASER; WARENZEICHEN;

788333

(LS2 2016 22 44)

### DB-Objekt-Nr.

## 2.12 Sonstige Urformverfahren

<b>Schlagwörter</b>	<b>SILICIUMSTAHL; SELEKTIVES LASERSCHMELZVERFAHREN; GERICHTETE ERSTARRUNG; TEXTUR</b>
<b>Titel deutsch</b>	Metallurgie zur Herstellung hochsiliziumhaltiger Stahlteile unter Verwendung des selektiven Laserschmelzverfahrens
<b>Titel original</b>	<b>Metallurgy of high-silicon steel parts produced using Selective Laser Melting</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	<p>The metallurgy of high-silicon steel (6.9%wt.Si) processed using Selective Laser Melting (SLM) is presented for the first time in this study. High-silicon steel has great potential as a soft magnetic alloy, but its employment has been limited due to its poor workability. The effect of SLM-processing on the metallurgy of the alloy is investigated in this work using microscopy, X-Ray Diffraction (XRD) and Electron Backscatter Diffraction (EBSD). XRD analysis suggests that the SLM high-silicon steel is a single ferritic phase (solid solution), with no sign of phase ordering. This is expected to have beneficial effects on the material properties, since ordering has been shown to make silicon steels more brittle and electrically conductive. For near-fully dense samples, columnar grains with a high aspect ratio and oriented along the build direction are found. Most importantly, a &lt;001&gt; fibre-texture along the build direction can be changed into a cube-texture when the qualitative shape of the melt-pool is altered (from shallow to deep) by increasing the energy input of the scanning laser. This feature could potentially open the path to the manufacture of three-dimensional grain-oriented high-silicon steels for electromechanical applications.</p>
<b>Autor(en)</b>	Garibaldi, Michele; Ashcroft, Ian; Simonelli, Marco; Hague, Richard
<b>Institution(en)</b>	The Univ. of Nottingham, GB
<b>Quelle</b>	Acta Materialia
<b>Verlag</b>	Kidlington, Oxford: Elsevier Science
<b>Band/Jahrgang</b>	110
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	May
<b>Seiten von-bis</b>	S.207-216
<b>S/Bild/Tab/Qu</b>	10S,8B,2T,23Q
<b>Bezugsquelle</b>	<a href="http://dx.doi.org/10.1016/j.actamat.2016.03.037">http://dx.doi.org/10.1016/j.actamat.2016.03.037</a>
<b>Deskriptoren</b>	FERRITISCHER STAHL; ADDITIVE FERTIGUNG; GERICHTETE ERSTARRUNG; TEXTUR; ABKÜHLUNGSGESCHWINDIGKEIT; SELEKTIVES LASERSCHMELZVERFAHREN; HOCHLEISTUNGSLASER; METALLPULVER; PULVERMETALLURGIE; SILICIUMSTAHL; WEICHMAGNETISCHER STAHL; RÖNTGENBEUGUNG; RÜCKSTREUELEKTRONEN-BEUGUNG; KRISTALLORIENTIERUNG; KRISTALLSTRUKTURANALYSE; PROZESSPARAMETER; POROSITÄT; RISSAUSBILDUNG; RISSLÄNGE; RASTERELEKTRONENMIKROSKOPIE; GITTERKONSTANTE; FESTE PHASE; VERDICHTUNG; CHEMISCHE ZUSAMMENSETZUNG; MIKROSTRUKTUR; KRISTALLMORPHOLOGIE; SCHMELZBAD; POLFIGUR; SUBGEFÜGE; geordnete Phase; Phasenbildung
<b>Standort</b>	VDEh P.5.436
<b>DB-Objekt-Nr.</b>	789410 (LS2 2016 22 45)

## 2.12 Sonstige Urformverfahren

<b>Schlagwörter</b>	<b>ADDITIVE FERTIGUNG; OKTETT-GITTERSTRUKTUR; ENERGIEABSORPTION; FE-ANALYSE; MECHANISCHES VERHALTEN</b>
<b>Titel deutsch</b>	Additiv gefertigte metallische Mikrogittermaterialien für hohe spezifische Energieabsorption bei statischer und dynamischer Belastung
<b>Titel original</b>	<b>Additively-manufactured metallic micro-lattice materials for high specific energy absorption under static and dynamic loading</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	<p>An octet truss lattice material is designed for energy absorption purposes featuring an exceptionally high specific energy absorption, a constant plateau stress between initial yield and densification, and zero plastic Poisson's ratio. It is demonstrated through detailed finite element simulations that the meso-structural response of metallic lattice materials under compression changes from an unstable twist mode to a stable buckling free mode at a relative density of about 0.3. Furthermore, it is found that the nature of the macroscopic stress-strain curve changes from mildly-oscillating to monotonically-increasing as the meso-structural deformation mode changes, while a stress-plateau is observed at relative densities above 0.3. Since the specific energy absorption is a monotonically increasing function of the relative density, lattice materials of relative densities around 0.3 feature both a plateau stress and a high specific energy absorption capability. Prototype materials are built from stainless steel 316L using Selective Laser Melting. The basic building element of the micro-lattices are 2.2 mm long beams with a 500 micron diameter cross-sections. Detailed micro- and meso-structural analysis including tomography, microscopy and EBSD analysis revealed substantial local material property variations within the lattice structure. Compression experiments are performed under static and dynamic loading conditions confirming the anticipated exceptional energy absorption material characteristics for strain rates of up to 1000/s.</p>
<b>Autor(en)</b>	Tancogne-Dejean, Thomas; Spierings, Adriaan B.; Mohr, Dirk
<b>Institution(en)</b>	ETH Zurich, CH; Massachusetts Institute of Technology, Cambridge, MA, US; INSPIRE, St. Gallen, CH
<b>Quelle</b>	Acta Materialia
<b>Verlag</b>	Kidlington, Oxford: Elsevier Science
<b>Band/Jahrgang</b>	116
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	September
<b>Seiten von-bis</b>	S.14-28
<b>S/Bild/Tab/Qu</b>	15S,12B,2T,28Q
<b>Bezugsquelle</b>	<a href="http://dx.doi.org/10.1016/j.actamat.2016.05.054">http://dx.doi.org/10.1016/j.actamat.2016.05.054</a>
<b>Deskriptoren</b>	ADDITIVE FERTIGUNG; ENERGIEABSORPTION; METALLISCHER WERKSTOFF; STATISCHE BELASTUNG; DYNAMISCHE BELASTUNG; FINITE-ELEMENTE-ANALYSE; GITTERSTRUKTUR; SPANNUNGS-DEHNUNGS-DIAGRAMM; SELEKTIVES LASERSCHMELZVERFAHREN; STRUKTURANALYSE; VERFORMUNGSGESCHWINDIGKEIT; GEOMETRISCHE FORM; PROZESSPARAMETER; MATHEMATISCHE BESCHREIBUNG; DRUCKPRÜFUNG; DICHTHE; THEORIE-EXPERIMENT-VERGLEICH; RÜCKSTREUELEKTRONEN-BEUGUNG; MECHANISCHES VERHALTEN; NICHTROSTENDER STAHL; METALLPULVER; Oktett-Gittergerüst; Split-Hopkinson-Bar-Versuch
<b>Standort</b>	VDEh P.5.436
<b>DB-Objekt-Nr.</b>	789458 (LS2 2016 22 46)

## 2.13 Herstellung von Ferrolegierungen

<b>Schlagwörter</b>	<b>FERROCHROMERZEUGUNG; ENTKOHLLEN; KONVERTERPROZESS</b>
<b>Titel deutsch</b>	Evaluierung der Auswirkung von CO <sub>2</sub> auf die Wärme- und Stoffbilanz beim Konverterprozess für die Herstellung von mittel- niedriggekohltem Ferrochrom
<b>Titel original</b>	<b>Evaluation on heat and materials balance of CO<sub>2</sub> involved in converter process for M-LcFeCr production</b>
<b>Dokumentart</b>	Tagungsbeitrag; Online Publikation
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	<p>During the production of Medium-Low Carbon Ferrochromium (M-LCFeCr) or Medium-Low Carbon Ferromanganese (M-LCFeMn) in converter process with introduction of oxygen, the oxidation reactions of main and tramp elements by oxygen are all exothermic reactions, hence lead to energy surplus in the production process. Essentially there are three practical strategies to deal with energy surplus: 1. Dilute the surplus energy by adding coolants. 2. Remove the surplus energy by blowing inert gases (like argon). 3. Neutralize the surplus energy by injecting part CO<sub>2</sub>. The first method is used frequently nowadays, but the additional coolants including silicochromium and M- 2 LCFeCr are costly and cause the temperature variation in a wide margin. The second way is not cost effective to remove small amount of heat by introducing the expensive argon. The last method could be moderate and worth to study. CO<sub>2</sub> introduction is aimed to realize controlling the bath temperature flexibly because C+CO<sub>2</sub> = 2CO is an endothermic reaction, enhancing the yield of Cr (Mn) because of its weaker oxidation ability, prolonging the life time of the converter lining because of less thermal shock. However, those advantages need to be proved by theoretical and experimentalwork. The heat and material balance calculation can provide a theoretical basis for the production practice with introduction of CO<sub>2</sub> in converter process. The authors pay attention to this aspect with the aim to optimize the amount of CO<sub>2</sub> and the materials requirements. The optimal ratio of CO<sub>2</sub> and O<sub>2</sub> for producing M-LCFeCr and M-LCFeMn with different carbon content has been determined.</p>
<b>Autor(en)</b>	Yu, H.C.; Wang, H.J.; Chu, S.J.; Xu, Z.B.
<b>Institution(en)</b>	School of Metallurgical and Ecological Engineering, University of Science and Technology Beijing, CN
<b>Quelle</b>	INFACON XIV, 14th International Ferroalloys Congress, Proceedings, Kyiv, UA, Mai 31- Jun 4, 2015
<b>Verlag</b>	Johannesburg: International Committee on Ferro-Alloys
<b>Erscheinungsjahr</b>	2015
<b>Seiten von-bis</b>	S.58-64
<b>S/Bild/Tab/Qu</b>	7S,4B,10T,15Q
<b>Bezugsquelle</b>	<a href="http://www.pyrometallurgy.co.za/InfaconXIV/058-Yu.pdf">http://www.pyrometallurgy.co.za/InfaconXIV/058-Yu.pdf</a>
<b>Deskriptoren</b>	FERROCHROM; ENTKOHLLEN; AOD-KONVERTER; THERMOCHEMIE; ENERGIEBILANZ; STOFFBILANZ; CO <sub>2</sub> ; INJEKTION; KÜHLUNG;
<b>DB-Objekt-Nr.</b>	784316 (LS2 2016 22 47)



## 2.13 Herstellung von Ferrolegierungen

<b>Schlagwörter</b>	<b>FERROMANGANERZEUGUNG; HOCHREAKTIVES REDUKTIONSMITTEL; KOKS; ELEKTROOFEN</b>
<b>Titel deutsch</b>	Beherrschung des Schmelzens von Ferrosilicomangan mit hochreaktivem Reduktionsmittel
<b>Titel original</b>	<b>Mastering of ferrosilicon manganese melting with highly reactive reducing agent</b>
<b>Dokumentart</b>	Tagungsbeitrag; Online Publikation
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	There has been a report of development and mastering of new type of special reducing agent at Yasinovsky Coking Plant, with the use in the burden for coking of highly reactive low-metamorphosed gas coal. The coke produced from the above mentioned coal preserves high reactivity from a genetic standpoint, as evidenced by investigation of its metallurgical properties and test melts of silicon manganese at Nikopol Ferroalloy Plant; however, manganese recovery into alloy is increased by 8-10% and specific power consumption is reduced by 70-170 kWh/t. In 2014, Nikopol Ferroalloy Plant consumed over 40 thousand tons of special highly reactive reducing agent produced by Yasinovsky Coking Plant.
<b>Autor(en)</b>	Grishchenko, S.G.; Ovcharuk, A.N.; Olshansky, V.I.; Filippov, I.Yu.; Taran, A.Yu; Chalenko, V.I.; Dudyak, V.N.; Pavlenko, S.V.
<b>Institution(en)</b>	Ukrainian Association of Ferroalloy Producers, Dnipropetrowsk, UA; National Metallurgical Academy of Ukraine, Dnipropetrowsk, UA; Nikopol Ferroalloy Plant, Dnipropetrowsk, UA; Yasinovsky Coking Plant, Makiyiwka, UA
<b>Quelle</b>	INFACON XIV, 14th International Ferroalloys Congress, Proceedings, Kyiv, UA, Mai 31- Jun 4, 2015
<b>Verlag</b>	Johannesburg: International Committee on Ferro-Alloys
<b>Erscheinungsjahr</b>	2015
<b>Seiten von-bis</b>	S.65-72
<b>S/Bild/Tab/Qu</b>	8S,3B,6T,5Q
<b>Bezugsquelle</b>	<a href="http://www.pyrometallurgy.co.za/InfaconXIV/065-Grishchenko">http://www.pyrometallurgy.co.za/InfaconXIV/065-Grishchenko</a>
<b>Deskriptoren</b>	FERROMANGAN; HERSTELLUNG; ELEKTROOFEN; NIEDERSCHACHTOFEN; KOKS; ERPROBUNG; ELEKTRISCHE LEITFÄHIGKEIT; REAKTIVITÄT (REAKTIONSFÄHIGKEIT); STROMVERBRAUCH;
<b>DB-Objekt-Nr.</b>	784321 (LS2 2016 22 48)

## 2.15 Nebenprodukte, Verwertung

<b>Schlagwörter</b>	<b>STAHLWERKSSCHLACKE; SEKUNDÄRROHSTOFF; BINDEMITTEL</b>
<b>Titel deutsch</b>	Die Verwertung der Stahlwerksschlacken zur Herstellung mineralischer Bindemittel
<b>Titel original</b>	<b>Production of mineral binder from steel-smelting slag</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	Auf experimentellem Wege wurden Möglichkeiten für die Aufbereitung der in den Lichtbogenöfen und in den Pfanenöfen anfallenden Schlacken für die Verwertung bei der Herstellung mineralischer Bindemittel untersucht. Die untersuchte Abdeckschlacke aus einem Pfanenofen (53,8 % CaO, 8,0 % SiO <sub>2</sub> , 21,6 % Al <sub>2</sub> O <sub>3</sub> , 1,1 % FeO, 1,42 % MnO, 9,8 % MgO, 0,23 % Cr <sub>2</sub> O <sub>3</sub> ) konnte nach einer Stabilisierung durch den Zusatz von tonerdereichen Flussmitteln für die Herstellung gipshaltiger Bindemittel verwendet werden. Die Schlacken aus den Lichtbogenöfen wurden als Bindemittel bei der Klinkerherstellung eingesetzt.
<b>Autor(en)</b>	Mikheenkov, M.A.; Sheshukov, O.Y.; Nekrasov, I.V.; Egiazaryan, D.K.; Lobanov, D.A.
<b>Institution(en)</b>	Institute of Metallurgy, UB RAS, Ekaterinburg, RU; Ural Federal University, Ekaterinburg, RU
<b>Quelle</b>	Steel in Translation
<b>Band/Jahrgang</b>	46
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	3
<b>Seiten von-bis</b>	S.232-235
<b>S/Bild/Tab/Qu</b>	4S,4B,1T,6Q
<b>Deskriptoren</b>	LICHTBOGENOFEN; PFANNENOFEN; SCHLACKE; SCHLACKENANALYSE; SEKUNDÄRROHSTOFF; SEKUNDÄRROHSTOFFAUFBEREITUNG; ANORGANISCHES BINDEMITTEL; ABFALLVERWERTUNG;
<b>Standort</b>	VDEh P.6.162
<b>DB-Objekt-Nr.</b>	784841 (LS2 2016 22 49)

## 2.15 Nebenprodukte, Verwertung

<b>Schlagwörter</b>	<b>EDELSTAHLSCHLACKE; BETON; MINERALOGISCHE ZUSAMMENSETZUNG</b>
<b>Titel original</b>	<b>Mineralogical composition of EAF slag and stabilised AOD slag aggregates and dimensional stability of slag aggregate concretes</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	An interesting valorisation way of EAF slag and stabilised AOD slag is their use as aggregates in concrete. Mineralogical studies of these steel slags are therefore necessary. In this study, observations of slag aggregates under UV light are associated with usual mineralogical analyses (XRD, SEM and EDS) to ensure more representative results of the mineralogical variability within slag aggregates. Relationships between aggregate mineral composition and UV fluorescence colours are proposed. Mineralogical studies also show that the stainless steel slag contains low amounts of expansive mineral phases (free CaO, free MgO) that could affect concrete volume stability. To verify this finding, swelling measurements of high strength concretes made of EAF slag and stabilised AOD slag aggregates are carried out. The linear expansion of stainless steel slag concretes is slightly higher than that measured for concretes with silico-calcareous aggregates.
<b>Autor(en)</b>	Adegoloye, G.; Beaucour, A.L.; Ortola, S.; Noumowe, A.
<b>Institution(en)</b>	Laboratoire de Mecanique et Materiaux du Genie Civil (L2MGC), Universite de Cergy-Pontoise, FR; Laboratoire Energetique Mecanique Electromagnetisme (LEME), Universite Paris Ouest Nanterre La Defense, Ville d'Avray, FR
<b>Quelle</b>	Construction and Building Materials
<b>Band/Jahrgang</b>	115
<b>Erscheinungsjahr</b>	2016
<b>Seiten von-bis</b>	S.171-178
<b>S/Bild/Tab/Qu</b>	8S
<b>Bezugsquelle</b>	<a href="http://dx.doi.org/10.1016/j.conbuildmat.2016.04.036">http://dx.doi.org/10.1016/j.conbuildmat.2016.04.036</a>
<b>Deskriptoren</b>	BETON; MINERALOGISCHE ZUSAMMENSETZUNG; EXPANSION; ULTRAVIOLETTLAMPE; ROSTFREIER STAHL; MINERAL; HOCHFESTER BETON; AOD-VERFAHREN; ELEKTROLICHTBOGENOFEN; Stahlwerksschlacke
<b>DB-Objekt-Nr.</b>	788765 (LS2 2016 22 50)

## 2.15 Nebenprodukte, Verwertung

<b>Schlagwörter</b>	<b>KONVERTERSCHLACKE; ENTPHOSPHORUNG; SCHLACKENVERWERTUNG; THERMODYNAMISCHE ANALYSE</b>
<b>Titel deutsch</b>	Thermodynamische Analyse und Untersuchung der vergasenden Entphosphorung von Konverterschlacken
<b>Titel original</b>	<b>Titel chinesisch</b>
<b>Titel englisch</b>	Thermodynamic analysis and experiment on gasification dephosphorization reaction of converter slag
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Chinesisch
<b>Abstract</b>	<p>It is a convenient way of recycle utilization of converter slag in steel plant, but the converter slag is rarely used as iron smelting raw material, because it contains high phosphorus element, which is difficult to be removed in sintering process. The phosphorus in sinter will enter into molten iron and lead to phosphorus enrichment in the process of blast furnace smelting, at the same time, it will aggravate the burden of dephosphorization during steel making. Under the condition of different pressure, series of thermodynamic calculations were performed using the Factsage6.2 to determine the beginning temperature of dephosphorus reaction for converter slag containing SiO<sub>2</sub> and containing no SiO<sub>2</sub>. Pure Ca<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub> and C were fully mixed to react with each other at the condition of 1100 deg C, 10(exp 3) Pa and microwave heating, and the possibility of the dephosphorization reaction was verified through detection of the reaction products. Furthermore, the gasification dephosphorization rate, under the same conditions, reached 31% after 30 min. The results make clear the thermodynamic conditions of gasification dephosphorization, and provide a theoretical basis for achieving the recycling of converter slag in iron and steel enterprises.</p>
<b>Autor(en)</b>	Wang, Yi-ci; Li, Hai-yang; Li, Shuang-wei; Luo, Guo-ping
<b>Institution(en)</b>	School of Material and Metallurgy, Inner Mongolia University of Science and Technology, Baotou, Nei Mongol, CN
<b>Quelle</b>	Journal of Iron and Steel Research (Chinese Edition)
<b>Band/Jahrgang</b>	28
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	6
<b>Seiten von-bis</b>	S.31-34
<b>S/Bild/Tab/Qu</b>	4S,2B,4T,12Q
<b>Bezugsquelle</b>	<a href="http://dx.doi.org/10.13228/j.boyuan.issn1001-0963.20150150">http://dx.doi.org/10.13228/j.boyuan.issn1001-0963.20150150</a>
<b>Deskriptoren</b>	LD-SCHLACKE; CHEMISCHE ZUSAMMENSETZUNG; RECYCLING; ABFALLVERWERTUNG; ENTPHOSPHORUNG; MIKROWELLENERWÄRMUNG; CHEMISCHE REAKTION; THERMODYNAMISCHE ANALYSE; GASDRUCK; TEMPERATUR;
<b>Standort</b>	VDEh P.5.1301
<b>DB-Objekt-Nr.</b>	789486 (LS2 2016 22 51)

## 2.16 Feuerfeste Stoffe und Auskleidung

<b>Schlagwörter</b>	<b>GIESPANNE; FEUERFESTE AUSKLEIDUNG; ERWEICHUNG</b>
<b>Titel original</b>	<b>Untersuchung des Erweichungsverhaltens von Feuerfestprodukten bei hohen Temperaturen</b>
<b>Titel englisch</b>	Investigating the Softening Behavior of Refractory Products at High Temperature
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Deutsch
<b>Abstract</b>	Feuerfestprodukte müssen im Einsatz auch bei hohen Temperaturen beträchtlichen mechanischen Belastungen dauerhaft standhalten. Solche mechanischen Belastungen gehen von dem Gewicht der feuerfesten Zustellung selbst aus (z.B. in der Wandzustellung von Stahlpfannen) oder werden von außen eingebracht (z.B. durch den flüssigen Stahl in Stahlwerkspfannen). Aufgrund des kombinierten Effekts der hohen Temperaturen und der mechanischen Belastungen können beträchtliche Verformung der Feuerfestzustellungen stattfinden, die den Betrieb behindern und die Lebensdauer einschränken. Mit einer innovativen Prüfeinrichtung wurden die Standardbedingungen zur Untersuchung des Erweichungsverhaltens von Feuerfestprodukten (DIN ISO 1983: Bestimmung des Erweichungsverhaltens unter Druck (Druckerweichen) und EN 993-9: Bestimmung des Druckfließverhaltens) erweitert. Dabei wurden unterschiedliche Gasatmosphären und verschiedene Belastungen untersucht, um die Kenntnisse zum Kriechverhalten von Feuerfestprodukten weiter auszubauen. Die primäre Kriechphase der Feuerfestprodukte wird durch die Prüfparameter (Temperatur, Belastung und Atmosphäre) beeinflusst. Die in der primären Kriechphase ausgebildete Mikrostruktur wirkt sich wiederum auf das Kriechverhalten im quasistabilen Zustand aus (sekundäre Kriechphase). Gleichzeitig konnten mithilfe eines optischen Dilatometers neuartige Informationen zum zweidimensionalen Erweichungsverhalten von Feuerfestprodukten bei steigender Temperatur und Belastung gewonnen werden. Diese Daten tragen zur Entwicklung von 3-dimensionalen Modellen komplexer feuerfester Bauteile und Strukturen, zum besseren Verständnis und zur Optimierung des Erweichungsverhaltens von Feuerfestprodukten bei.
<b>Autor(en)</b>	Brochen, Erwan; Dannert, Christian; Pilate, Pascal
<b>Institution(en)</b>	Forschungsgemeinschaft Feuerfest, Höhr-Grenzhausen, DE; Centre de Recherches de l'Industrie Belge de la Ceramique (CRIBC), Mons, BE
<b>Quelle</b>	Gießerei-Praxis
<b>Band/Jahrgang</b>	67
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	4
<b>Seiten von-bis</b>	S.136-142
<b>S/Bild/Tab/Qu</b>	7S,4Q
<b>Deskriptoren</b>	MECHANISCHE BELASTUNG; FEUERFESTPRODUKT; KRIECHVERHALTEN; FEUERFESTE ZUSTELLUNG; DRUCKERWEICHUNG; LEBENSDAUER; FLIEßVERHALTEN; GASATMOSPHERE; DIN-NORM; FLÜSSIGER STAHL; STAHLWERK; PRÜFEINRICHTUNG; MIKROSTRUKTUR; DREIDIMENSIONALES MODELL; HOCHTEMPERATUR; PRÜFBEDINGUNG; KRIECHVERSUCH; PRIMÄRES KRIECHEN; Erweichungsverhalten; Druckfließverhalten; Prüfparameter; Stahlpfanne; Stahlwerkspfanne; Standardbedingung; optisches Dilatometer; kombinierter Effekt; Industrieausrüstung
<b>DB-Objekt-Nr.</b>	788588 (LS2 2016 22 52)

## 2.16 Feuerfeste Stoffe und Auskleidung

<b>Schlagwörter</b>	<b>SCHAUMKERAMIKFILTER; STAHLSCHEMELZEFILTRATION; NANOTECHNOLOGIE; OBERFLÄCHENBESCHICHTUNG</b>
<b>Titel deutsch</b>	Funktionelle Beschichtungen auf kohlenstoffgebundenen Schaumkeramikfiltern für die Stahlschmelzefiltration
<b>Titel original</b>	<b>Functional coatings on carbon-bonded ceramic foam filters for steel melt filtration</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	Ceramic foam filters have been used by steel foundries for several years as an effective physical refining solution after the ladle treatment. Recently, new approaches involving "active" and "reactive" coatings applied on the filters have been proposed, in order to improve their efficiency during operation. In this work, two different coating methods are presented. The first exploits the reaction of carbon-bonded alumina–magnesia filters when immersed in a steel melt at about 1650 deg C. In this case, the coating is formed directly during operation: due to the carbothermal reduction of magnesia and dissolution of alumina, in situ spinel formation is observed. This also results in a volume expansion that counteracts the shrinkage of the filter material related to sintering and pyrolysis phenomena. Next, multi-walled carbon nanotubes (MWCNTs) are applied on carbon-bonded alumina filters by means of spray coating to increase the reactivity of the surface. The performance of the coated filters is assessed in comparison to uncoated ones, using a special steel casting simulator under controlled atmosphere. The microscope investigations after 10 and 30s of immersion indicate a better performance of the MWCNTs-coated filters.
<b>Autor(en)</b>	Storti, Enrico; Dudczig, Steffen; Emmel, Marcus; Colombo, Paolo; Aneziris, Christos G.
<b>Institution(en)</b>	TU Bergakademie Freiberg, DE; ESK-SiC, Frechen, DE; Padova Univ., IT; The Pennsylvania State Univ., University Park, PA, US
<b>Quelle</b>	Steel Research International
<b>Verlag</b>	Düsseldorf: Wiley-VCH
<b>Band/Jahrgang</b>	87
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	8
<b>Seiten von-bis</b>	S.1030–1037
<b>S/Bild/Tab/Qu</b>	8S,9B,1T,27Q
<b>Bezugsquelle</b>	<a href="http://dx.doi.org/10.1002/srin.201500446">http://dx.doi.org/10.1002/srin.201500446</a>
<b>Deskriptoren</b>	SCHAUMKERAMIK; FILTER (STOFFTRENNUNG); STAHLSCHEMELZE; OBERFLÄCHENBESCHICHTUNG; EFFIZIENZSTEIGERUNG; KERAMISCHER FILTER; NANORÖHRCHEN; RÖNTGENBEUGUNG; HAFTSTELLE (TRAPPING); FILTRATION; NANOTECHNOLOGIE; Stahlschmelzefilter; Funktionshohlraum; spinellbildender Filter; kohlenstoffgebundener Filter
<b>Standort</b>	VDEh P.5.183
<b>DB-Objekt-Nr.</b>	789390 (LS2 2016 22 53)

## 2.17 Anlagentechnik, allgemeine Werkseinrichtungen, Nebenanlagen

<b>Schlagwörter</b>	<b>STAHLINDUSTRIEANLAGEN; TRIBOLOGISCHES SYSTEM; GLEITKONTAKT; BESCHICHTUNGSKONZEPT</b>
<b>Titel original</b>	<b>Optimierung von hochbeanspruchten Gleitkontakten durch den Einsatz innovativer Beschichtungs- und Oberflächenkonzepte</b>
<b>Dokumentart</b>	Tagungsbeitrag
<b>Sprache(n)</b>	Deutsch
<b>Abstract</b>	Gleitkontakte im Grenzreibungsgebiet (geringe Gleitwege und -geschwindigkeiten; hohe instationäre Belastungen, aggressive Umgebungsbedingungen) sind in vielfältigen Anwendungen wie z.B. fettgeschmierten Lagerungen in Windkraftanlagen, der Stahlindustrie oder Anlagen der Aufbereitungstechnik anzutreffen. Im Rahmen eines Gemeinschaftsprojektes wurde der Gleitkontakt eines Hybridlagers für Rollen in Stranggießanlagen (Stahl) optimiert. Ziele waren neben der Schaffung der Voraussetzung für eine Lebensdauerschmierung eine Verbesserung des Betriebsverhaltens. Die Untersuchungen erfolgten entsprechend dem Prinzip der tribologischen Prüfkette durch unterschiedliche Modellprüfungen, Bauteil-ähnliche Prüfungen, Bauteilversuche und eine abschließende Bewertung durch einen Betriebsversuch in einer Stranggießanlage. Getestet wurden unterschiedliche Gleitlacksysteme und alternative Beschichtungssysteme. Mit der Anwendung von PTFE-haltigen Gleitlacksystemen konnte im Vergleich zum geschmierten Referenzsystem (Stahl - Stahl) eine deutliche Verbesserung des tribologischen Verhaltens erreicht werden.
<b>Autor(en)</b>	Borgböhmer, N.; Keuntje, J.; Kurzynski, C.; Krücken, C.; Meiß, S.; Paland, F.
<b>Institution(en)</b>	CARL BECHEM, Hagen, DE; VDEh Betriebsforschungsinstitut, Düsseldorf, DE; ThyssenKrupp Steel Europe, Duisburg, DE; Eich Rollenlager, Hattingen, DE
<b>Quelle</b>	Reibung, Schmierung und Verschleiß: Forschung und praktische Anwendungen, 56. Tribologie-Fachtagung, Bd.1, Göttingen, DE, 21.-23. Sep, 2015
<b>Verlag</b>	Aachen: Gesellschaft für Tribologie e.V.
<b>ISBN</b>	978-3-9817451-0-8
<b>Erscheinungsjahr</b>	2015
<b>Seiten von-bis</b>	S.23/1-23/10
<b>S/Bild/Tab/Qu</b>	10S,9B,2T,5Q
<b>Deskriptoren</b>	STAHLINDUSTRIE; TRIBOLOGIE; ANLAGENBAU; GLEITKONTAKT; HYBRIDLAGER; STRANGGIEßANLAGE; BESCHICHTUNGSSYSTEM; TRIBOLOGISCHE EIGENSCHAFT; SCHMIERUNG; LEBENSDAUER; REIBUNG-SCHMIERUNG-VERSCHLEIß; GLEITLACK; FESTSCHMIERSTOFF; VERSUCHSDURCHFÜHRUNG;
<b>Standort</b>	VDEh 5.7930 (56, 2015, 1)
<b>DB-Objekt-Nr.</b>	789534 (LS2 2016 22 54)

## 2.20 Umwelt- und Arbeitsschutz

<b>Schlagwörter</b>	<b>FINGERSCHACHT-LICHTBOGENOFEN; PFANNENOFEN; ABGASREINIGUNG; SCHLAUCHFILTER</b>
<b>Titel deutsch</b>	Die Rekonstruktion des Abgasreinigungssystems eines Schacht- und Pfannenofens im Hüttenkombinat Severstal (Cherepovets, Russland)
<b>Titel original</b>	<b>Reconstruction of gas-purification system and ladle-furnace unit at PAO Severstal</b>
<b>Dokumentart</b>	Zeitschriftenaufsatz
<b>Sprache(n)</b>	Englisch
<b>Abstract</b>	The gas-purification system for shaft electrofurnace 1 and ladle-furnace unit 1 at PAO Severstal (Cherepovets, Russia) have been reconstructed by specialists from Energostal Ukrainian Scientific and Technological Center (Kharkov, Ukraine). For the first time in the world, large electrofilters have been replaced by bag filters with pulsed regeneration (total filtration area 33000 m <sup>2</sup> (exp 2)). The influence of dust deposits from the furnace in various smelting periods on the dust concentration in the atmosphere of the working zone has been studied. The waste gases and unorganized emissions are completely removed from the furnace, with guaranteed atmospheric levels in the working zone that do not exceed the background concentrations by more than the maximum permissible concentration (1 kg/m <sup>3</sup> (exp 3)) and residual dust concentration of 3 to 5 mg/m <sup>3</sup> (exp 3) at the smokestack.
<b>Autor(en)</b>	Stalinskiy, D.V.; Mantula, V.D.; Pirogov, A.Y.; Shaparenko, A.V.; Shvets, M.N.
<b>Institution(en)</b>	Energostal Ukrainian Scientific and Technological Center, Kharkov, UA
<b>Quelle</b>	Steel in Translation
<b>Band/Jahrgang</b>	46
<b>Erscheinungsjahr</b>	2016
<b>Heft/Monat</b>	2
<b>Seiten von-bis</b>	S.159-163
<b>S/Bild/Tab/Qu</b>	5S,5B,5Q
<b>Deskriptoren</b>	LICHTBOGENOFEN; SCHACHTOFEN; PFANNENOFEN; ABGASREINIGUNGSSYSTEM; ELEKTROFILTER; SCHLAUCHFILTER; STAUB; SCHADSTOFFEMISSION; LUFTREINHALTUNG; Fingerschachtofen
<b>Standort</b>	VDEh P.6.162
<b>DB-Objekt-Nr.</b>	791052 (LS2 2016 22 55)