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Altri autori (Persone)	BiermannHorst
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Soggetti	Metals Ceramic materials Materials - Analysis Thermodynamics Building materials X-ray spectroscopy Metals and Alloys Ceramics Materials Characterization Technique Steel, Light Metal X-Ray Spectroscopy
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Livello bibliografico	Monografia
Nota di contenuto	Carbon-bonded filter materials and filter structures with active and reactive functional pores for steel melt filtration -- In-situ high-temperature microscopy on the interaction of exogenous non-metallic particles with endogenous particles in molten steel -- New insights in the aluminum melt filtration -- Thermodynamic assessment as a tool for modeling interactions at the interface between ceramic filter and melt -- Structural and thermodynamic properties of filter materials: A Raman and DFT investigation -- Microstructure of filter constituents and non-metallic inclusions and their interaction at high temperatures -- Using SPS/FAST to facilitate interface reactions and to establish reaction mechanisms -- Dealing with Fe in secondary Al-Si cast alloys

including metal melt filtration -- Influence of reactive filter materials on casting’s quality in aluminum casting -- Filtration of magnesium -- Qualitative and quantitative X-ray tomography of filter macrostructures and functional components -- Metal melt filtration in a water-based model system using a semi-automated pilot plant: experimental methods, influencing factors, models -- Modelling and Pore-Scale Simulation of Fluid Flow and Particle Transport inside Open-cell Foam Filters for Metal Melt -Filtration -- Characterisation of Heat Transport and Diffusion Processes during Metal Melt Filtration-Microprocesses of agglomeration, heterocoagulation and particle deposition of poorly wetted surfaces in the context of metal melt filtration and their scale up -- Modeling and evaluation of the chemo-thermo-mechanical behavior of filter materials and filter structures -- Reactive cleaning and active filtration in continuous steel casting -- Virtual Prototyping of 3D Printed Metal Melt Filters: An HPC-based Workflow and Software Tool Chain -- Registration of filtration efficiency of active or reactive filter in contact with steel melt in a steel casting simulator -- Decopperization by utilization of filter and the thermophysical propertiesof low content of Fe-Cu alloys -- Interactions between molten iron and carbon bonded ceramics -- High-temperature strength and form stability of compact and cellular carbon bonded alumina -- Determination of the temperature-dependent fracture and damage properties of ceramic filter materials from small scale specimen -- Influence of internal defects on the fatigue life of steel and aluminium alloys in the VHCF range -- Analysis of detrimental inclusions in steel and aluminum -- Numerical and statistical modelling in the identification of positions of non-metallic inclusions in steel samples based on thermography data from ultrasonic fatigue testing -- Effect of non-metallic inclusions on the temperature and strain rate-dependent strength, deformation and toughness behavior of high-strength quenched and tempered steel -- Influence of filter structure and casting system on filtration efficiency in aluminium mould casting -- Filtration of non metallic impurities (dross) specifically occurring in cast iron with nodular graphite -- Cleanness of molten steel – active and reactive, exchangeable filter systems for the continuous casting of steel -- Numerical simulation of continuous steel casting regarding the enhancement of the cleanliness of molten steel -- Precipitation of iron-containing intermetallic phases from aluminum alloys by metal melt filtration -- Functionalized feeders, hollowware, spider bricks and starter casting tubes for increasing the purity in steel casting processes -- Increasing cleanliness of Al-melts by additon of ceramic fibers.

Sommario/riassunto

This open access book covers novel techniques and materials for removing inclusions in metallic melts, resulting in significant improvements to the purity, quality, and materials properties of the cast metal product. It looks at an entirely new generation of intelligent filter materials and filter systems with functionalized surfaces for removing solid and liquid inclusions such as deoxidation products, sulfides, and nitrides carbide from metallic melts. This collection of contributed chapters addresses the overarching goal of the production of lightweight structures and high-demand construction materials within an overall substantially cleaner and more sustainable global supply chain. The chapters cover a diverse array of topics ranging in scope from the development of ceramic foam filters, to in-situ x-ray and optical characterization techniques, as well as advanced modelling of 3D-printed filter structures. Additionally, the book features a number of contributions directly transferable to industrial applications related to the clean metal casting technologies of aluminium and steel alloys.