

DC Casting of Aluminium: Process Behaviour and Technology

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Synopsis

This paper reviews the physical phenomena and technology of DC casting of aluminium. The basic process, its variants, history and commercial aspects are described. The process physics such as heat and fluid flow, solidification microstructure, thermal stress, deformation and cracking are discussed. We illustrate how understanding the physical phenomena occurring during DC casting has led to modifications and new variants of the technology. This understanding has in the past ten years often been aided by the application of mathematical models, and many examples are given. The mechanisms of formation of the surface region and various mould technologies used to control this region are reviewed, including low metal level casting, hot top moulds, gas pressurised hot tops, and electromagnetic casting. Methods of controlling deformation at cast start, and cracking are discussed. Some engineering and safety aspects are considered and the article concludes with a brief discussion of future prospects.

Dc Casting Of Aluminium Process Behaviour And Technology

Raffaella Di Napoli



Dc Casting Of Aluminium Process Behaviour And Technology:

Fundamentals of Aluminium Metallurgy Roger Lumley, 2010-11-25 Aluminium is an important metal in manufacturing due to its versatile properties and the many applications of both the processed metal and its alloys in different industries. Fundamentals of aluminium metallurgy provides a comprehensive overview of the production properties and processing of aluminium and its applications in manufacturing industries. Part one discusses different methods of producing and casting aluminium covering areas such as casting of alloys, quality issues and specific production methods such as high pressure diecasting. The metallurgical properties of aluminium and its alloys are reviewed in Part two with chapters on such topics as hardening, precipitation processes and solute partitioning and clustering as well as properties such as fracture resistance. Finally Part three includes chapters on joining, laser sintering and other methods of processing aluminium and its applications in particular areas of industry such as aerospace. With its distinguished editor and team of expert contributors, Fundamentals of aluminium metallurgy is a standard reference for researchers in metallurgy as well as all those involved in the manufacture and use of aluminium products. Provides a comprehensive overview of the production properties and processing of aluminium and its applications in manufacturing industries. Considers many issues of central importance in aluminium production and utilization considering quality issues and design for fatigue growth resistance. Metallurgical properties of aluminium and its alloys are further explored with particular reference to work hardening and applications of industrial alloys.

Advances in Wrought Magnesium Alloys Colleen Bettles, Matthew Barnett, 2012-04-25 This important book summarises the wealth of recent research on our understanding of process property relationships in wrought magnesium alloys and the way this understanding can be used to develop a new generation of alloys for high performance applications. After an introductory overview of current developments in wrought magnesium alloys, part one reviews fundamental aspects of deformation behaviour. These chapters are the building blocks for the optimisation of processing steps covered in part two which discusses casting, extrusion, rolling and forging technologies. The concluding chapters cover applications of wrought magnesium alloys in automotive and biomedical engineering. With its distinguished editors and drawing on the work of leading experts in the field, Advances in wrought magnesium alloys is a standard reference for those researching manufacturing and using these alloys. Summarises recent research on our understanding of process property relationships in wrought magnesium alloys. Discusses the way this understanding can be used to develop a new generation of alloys for high performance applications. Reviews casting, extrusion, rolling and forging technologies, fundamental aspects of deformation behaviour and applications of wrought magnesium alloys in automotive and biomedical engineering.

Light Metals 2024 Samuel Wagstaff, 2024-02-03 The Light Metals symposia at the TMS Annual Meeting Exhibition present the most recent developments, discoveries and practices in primary aluminum science and technology. The annual Light Metals volume has become the definitive reference in the field of aluminum production and related light metal technologies. The 2024

collection includes contributions from the following symposia Alumina Bauxite Aluminum Alloys Development and Manufacturing Aluminum Reduction Technology Electrode Technology for Aluminum Production Melt Processing Casting and Recycling Scandium Extraction and Use in Aluminum Alloys Chapter s Online Monitoring of Metal Oxides in Molten Fluoride Electrolytes is available open access under a Creative Commons Attribution 4 0 International License via Springerlink

Light Metals 2012 Carlos Suarez,2016-12-23 An update of the definitive annual reference source in the field of aluminum production and related light metals technologies a great mix of materials science and practical applied technology surrounding aluminum bauxite aluminum reduction rolling casting and production **Essential Readings in Light**

Metals, Volume 3, Cast Shop for Aluminum Production John Grandfield,Dmitry Eskin,2016-12-23 ONE OF A FOUR BOOK COLLECTION SPOTLIGHTING CLASSIC ARTICLES Original research findings and reviews spanning all aspects of the science and technology of casting Since 1971 The Minerals Metals Materials Society has published the Light Metals proceedings Highlighting some of the most important findings and insights reported over the past four decades this volume features the best original research papers and reviews on cast shop science and technology for aluminum production published in Light Metals from 1971 to 2011 Papers have been divided into ten subject sections for ease of access Each section has a brief introduction and a list of recommended articles for researchers interested in exploring each subject in greater depth Only 12 percent of the cast shop science and technology papers ever published in Light Metals were chosen for this volume Selection was based on a rigorous review process Among the papers readers will find landmark original research findings and expert reviews summarizing current thinking on key topics at the time of publication From basic research to industry standards to advanced applications the articles published in this volume collectively represent a complete overview of cast shop science and technology supporting the work of students researchers and engineers around the world

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