
High Temperature Oxidation and Ignition Behaviour of Magnesium Alloys Containing Strontium (Sr) and Neodymium (Nd). This invaluable book reviews the state of the art of high temperature related problems pertaining to their utility, microstructure, mechanical properties, actual behavior in different environments, their protection by various kinds of coatings at high temperatures and a new concept of nanomaterials at high temperatures. The book begins with fundamentals of oxidation and corrosion. Various concepts relating to the modification or deterioration of mechanical properties when material is exposed to an aggressive environment compared to an inert environment or vacuum are also covered. Other chapters highlight the behavior of various advanced materials to high temperature conditions, an important high temperature effect called Active Element Effect, and many high temperature coatings and their behavior. Written by world-renowned authors in their own field, this book will be useful for professionals and academics in materials science and nanoscience.


Advances in Plastic Forming of Metals. The result of a fruitful, on-going collaboration between academia and industry, this book reviews recent advances in research on oxide scale behavior in high-temperature forming processes. Presenting novel, previously neglected approaches, the authors emphasize the pivotal role of reproducible experiments to elucidate the oxide scale properties and develop quantitative models with predictive accuracy. Each chapter consists of a detailed, systematic examination of different aspects of oxide scale formation with immediate impact for researchers and developers in industry. The clear and stringent style of presentation makes this monograph both coherent and easily readable.

Waste Production and Utilization in the Metal Extraction Industry. The world's ever-growing demand for power has created an urgent need for new efficient and sustainable sources of energy and electricity. Today's consumers of portable electronics also demand devices that not only deliver more power but are also environmentally friendly. Fuel cells are an important alternative energy source, with promise in military, commercial and industrial applications, for example power vehicles and portable devices. A fuel cell is an electrochemical device that directly converts the chemical energy of a fuel into electrical energy. Fuel cells represent the most efficient energy conversion technologies to-date and are an integral part in the new and renewable energy chain (e.g., solar, wind and hydropower). Fuel cells can be classified as either high-temperature or low-temperature, depending on their operating temperature, and have different materials requirements. This book is dedicated to the study of high temperature fuel cells. In high-temperature fuel cells, the electrolyte materials are ceramic or molten carbonate, while the electrode materials are ceramic or metal (but not precious metal). High operation temperature fuel cells allow internal reforming, promote rapid kinetics with non-precious materials and offer high flexibilities in fuel choice, and are potential and viable candidate to moderate the fast increase in power requirements and to minimize the impact of the increased power consumption on the environment. ‘Materials for High Temperature Fuel Cells’ is part of the series on Materials for Sustainable Energy. The authors—note experts in the field—describe new materials and advances in materials science and innovation for renewable energy, clean use of fossil energy, and greenhouse gas mitigation and associated environmental technologies.

High Temperature Coatings. A comprehensive text to the non-destructive evaluation of degradation of materials due to environment that takes an interdisciplinary approach. Non-Destructive Evaluation of Corrosion and Corrosion-assisted Cracking is an important resource that covers the critical interdisciplinary topic of non-destructive evaluation of degradation of materials due to environment. The authors—note experts in the field—describe new materials and advances in materials science and innovation for renewable energy, clean use of fossil energy, and greenhouse gas mitigation and associated environmental technologies.
field—offer an overview of the wide-variety of approaches to non-destructive evaluation and various types of corrosion. The text is filled with instructive case studies from a range of industries including aerospace, energy, defense, and automotive. The authors provide the most common non-destructive evaluation techniques that are applied in both research and industry in order to evaluate the properties and more importantly, degradation of materials components or systems without causing damage. Ultrasonic, radiographic, thermographic, electromagnetic, and optical are some of the methods explored in the book. This important text: Offers a groundbreaking interdisciplinary approach to non-destructive evaluation of corrosion and corrosion-assisted cracking Discusses techniques for non-destructive evaluation and various types of corrosion Includes information on the application of a variety of techniques as well as specific case studies Contains information targeting industries such as aerospace, energy, processing Presents information from leading researchers and technologists in both non-destructive evaluation and corrosion Written for life assessment and maintenance personnel involved in quality control, failure analysis, and R&D. Non-Destructive Evaluation of Corrosion and Corrosion-assisted Cracking is an essential interdisciplinary guide to the topic.

Introduction to High Temperature Oxidation and Corrosion This book brings together the experience of specialists on High Temperature Corrosion. The authors discuss topics related to the high temperature corrosion of engineering alloys, ceramics and protective coatings. The papers will be a useful and dynamic tool for those wishing to increase their knowledge of High Temperature Corrosion, as well as providing a guide to recent literature in this field.

High Temperature Corrosion and Materials Chemistry 7 Selected, peer reviewed papers from the 3rd International Symposium on High-Temperature Oxidation and Corrosion, (ISHOC), November 8-11, 2010, Zushi, Japan

Intermetallic Matrix Composites This book summarizes the advanced manufacturing technology of original innovations in hot stamping of lightweight car body. A detailed description of the technical system and basic knowledge of sheet metal forming is given, which helps readers quickly understand the relevant knowledge in the field. Emphasis has been placed on the independently developed hot stamping process and equipment, which helps describe the theoretical and experimental research on key problems involving stress field, thermal field and phase transformation field in hot stamping process. Also, a description of the formability at elevated temperature and the numerical simulation algorithms for high strength steel hot stamping is given in combination with the experiments. Finally, the book presents some application cases of hot stamping technology such as the lightweight car body design using hot stamping components and gradient hardness components, and the cooling formability tool. This book is intended for researchers, engineers and graduate students in vehicle engineering, mechanical engineering, especially in the field of advanced manufacturing technology. The book also provides a useful reference for other new technology related temperature and phase transformation, such as aluminum-magnesium alloy hot stamping.

Springer Handbook of Metrology and Testing The result of a fruitful, on-going collaboration between academia and industry, this book reviews recent advances in research on oxide scale behavior in high-temperature forming processes. Presenting novel, previously neglected approaches, the authors emphasize the pivotal role of reproducible experiments to elucidate the oxide scale properties and develop quantitative models with predictive accuracy. Each chapter consists of a detailed, systematic examination of different aspects of oxide scale formation with immediate impact for researchers and developers in industry. The clear and stringent style of presentation makes this monograph both coherent and easily readable.

High Temperature Corrosion and Materials Chemistry III A comprehensive collection of peer-reviewed data and information on corrosion in the petroleum, petrochemical, and chemical processing industries from a number of ASM International publications. The principal sources are Corrosion, Volume 13, and Failure Analysis and Prevention, Volume 11 of ASM H

Hot Stamping Advanced Manufacturing Technology of Lightweight Car Body

High-temperature Oxidation of Metals “The high temperature oxidation and ignition of magnesium (Mg) and its alloys have restricted their use in many applications, such as civilian aircraft and other aerospace components. Recent research activities have aimed at increasing the resistance of Mg alloys to oxidation and ignition by modifying the MgO surface scale to a more protective barrier oxide between the metal and the gas environment. Alloying is one of the techniques to alter the surface oxide structure. In this thesis, two different alloying elements, namely an alkaline earth element strontium (Sr) and a rare earth element neodymium (Nd), are studied over a range of compositions with respect to their effects on high temperature oxidation behavior and ignition temperature. Mg-Nd Alloys: In the range of 0-6 wt% Nd, the effect of Nd was composition dependent. The Ti increased from 640 °C of pure Mg to 770 oC at 0.5 wt% Nd. The beneficial effect saturated at 0.5 wt% Nd with no further significant increase in Ti as Nd increased to 6 wt% Nd (Ti is 780 °C). The oxidation behavior was investigated first on dilute Mg-Nd alloys (Nd up to 0.5 wt%) and secondly on Mg-Nd alloys in Nd saturated at 0.5 wt% Nd with no further significant increase in Ti as Nd increased to 6 wt% Nd (Ti is 780 °C). The oxidation behavior was investigated first on dilute Mg-Nd alloys (Nd up to 0.5 wt%) and secondly on Mg-Nd alloys in Nd saturated at 0.5 wt% Nd with no further significant increase in Ti as Nd increased to 6 wt% Nd (Ti is 780 °C). The oxidation behavior was investigated first on dilute Mg-Nd alloys (Nd up to 0.5 wt%) and secondly on Mg-Nd alloys in Nd saturated at 0.5 wt% Nd with no further significant increase in Ti as Nd increased to 6 wt% Nd (Ti is 780 °C). The oxidation behavior was investigated first on dilute Mg-Nd alloys (Nd up to 0.5 wt%) and secondly on Mg-Nd alloys in Nd saturated at 0.5 wt% Nd with no further significant increase in Ti as Nd increased to 6 wt% Nd (Ti is 780 °C).
Temperature Metal Processing

Read PDF Oxide Scale Behavior In High Temperature Metal Processing

Mg-(0.5-6 wt%) Nd alloys. Mg-Sr Alloys: The oxidation and ignition of Mg-Sr alloys were investigated over the range 8-6 wt% Sr. Ti increased gradually with increased Sr from 640 °C to 860 °C (at 6 wt% Sr). The formation of MgO and SrO in the oxide scale greatly delayed the ignition of the alloys. The interrupted tests showed that the presence of surface active Sr at the metal/oxide interface prevented MgO formation and Mg vaporization through the cracks, which delayed the rapid temperature increase seen on the pure Mg surface and explained the continued beneficial effect of Sr on ignition resistance as Sr increased towards 6 wt% Sr. The oxidation tests at 500 °C revealed extensive SrO formation on the solid solution region on Mg-54at%Slr alloy surface; since Mg-Sr solid solution is associated with Mg, this is a new form of Mg oxidation. This delay is due to the surface activity of Sr. The oxidation kinetics slowed down with Sr additions: the parabolic rate constant decreased to ~3x10-7 mg cm-2 s-1, and the linear rate constants decreased to 2x10-4 mg cm-2 s-1.

High Temperature Mechanical Behaviour of Ceramic Composites Intermetallic Matrix Composites: Properties and Applications is a comprehensive guide that studies the types and properties of intermetallic matrix composites, including their processing techniques, characterization and the various testing methods associated with these composites. In addition, it presents modeling techniques, their strengthening mechanisms and the important area of failure and repair. Advanced /complex IMCs are then explained, such as Self-healing IMCs and laminated intermetallic composites. The book concludes by delving into the industries that use these materials, including the automotive industry. Reviews the latest research in intermetallic matrix composites Contains a focus on properties and applications Includes contributions from leading experts in the field

Joint EPRI – 123HI MAT International Conference on Advances in High-Temperature Materials Proceedings from: EPRI’s 9th International Conference on Advances in Materials Technology for Fossil Power Plants and the 2nd International 123HI MAT Conference on High-Temperature Materials

High Performance Structural Materials "ASTM Stock Number: STP1428. - Fourth Symposium on Thermomechanical Fatigue Behavior of Materials, held in Dallas, Texas on November 7-8, 2001. The Symposium was sponsored by ASTM Committee E08 on Fatigue and Fracture and its Subcommittee E08.05 on Cyclic Deformation and Fat. - Includes bibliographical references and indexes. ASTM International; 2011.

Behaviour of High Temperature Alloys in Aggressive Environments The papers included in this issue of ECS Transactions were originally presented in the symposium "High Temperature Corrosion and Materials Chemistry 71", held during the PRUME 2008 joint international meeting of The Electrochemical Society and The Electrochemical Society of Japan, with the technical co-sponsorship of the Japan Society of Applied Physics, the Korean Electrochemical Society, the Electrochemistry Division of the Royal Australian Chemical Institute, and the Chinese Society of Electrochemistry. This meeting was held in Honolulu, Hawaii, from October 12 to 17, 2008.

Tribology in Manufacturing Technology High-Entropy Alloys, Second Edition provides a complete review of the current state of the field of high entropy alloys (HEA). Building upon the first edition, this fully updated release includes new theoretical understandings of these materials, highlighting recent developments on modeling and new classes of HEAs, such as Eutectic HEAs and Dual phase HEAs. Due to their unique properties, high entropy alloys have attracted considerable attention from both academics and technologists. This book presents the fundamental knowledge, the spectrum of various alloy systems and their characteristics, key focus areas, and the future scope of the field in terms of research and technological applications. Provides an up-to-date, comprehensive understanding on the current status of HEAs in terms of theoretical understanding and modeling efforts Gives a complete idea on alloy design criteria of various classes of HEAs developed so far Discusses the microstructure property correlations in HEAs in terms of structural and functional properties Presents a comparison of HEAs with other multicomponent systems, like intermetallics and bulk metallic glasses

High Temperature Corrosion This text for graduate and post graduate students covers fundamentals of high temperature corrosion and related topics. Early chapters cover the thermodynamics and kinetics of oxidation and defect structure of oxides and diffusion in oxides, and later chapters cover thin and thick layer oxidation, o

Corrosion in the Petrochemical Industry

Intermetallic Research Progress The 14th International Conference on Wear of Materials took place in Washington, DC, USA, 30 March - 3 April 2003. These proceedings contain over two-hundred peer reviewed papers containing the best research, technical developments and engineering case studies from around the world. Biomaterials and nano-tribology receive special attention in this collection reflecting the general trends in the field. Further highlights include a focus on the new generation of instrumentation to probe wear at increasingly small scales. Approximately ninety communications and case studies, a popular format for the academic community have also been included, enabling the inclusion of the most up-to-date research. Over 200 peer-reviewed papers including hot topics such as biomaterials and nano-tribology Keeping you up-to-date with the latest research from leading experts Includes communications and case studies

Wear of Materials High Temperature Coatings, Second Edition, demonstrates how to counteract the thermal effects of rapid corrosion and degradation of exposed materials and equipment that can occur under high operating temperatures. This is the first true practical guide on the use of thermally protective coatings for high-temperature applications, including the latest developments in materials used for protective coatings. It covers the make-up and behavior of such materials under thermal stress and the methods used for applying them to specific types of substrates, as well as invaluable advice on inspection and repair of existing thermal coatings. With his long experience in the aerospace gas turbine industry, the author has compiled the very latest in coating materials and coating technologies, including appropriate inspection protocols. The book is supplemented with the latest reference information and additional support to help readers find more application- and industry-type coatings specifications and uses. Offers an overview of the underlying fundamental concepts of thermally-protective coatings, including thermodynamics, energy kinetics,
crystallography and equilibrium phases Covers essential chemistry and physics of underlying substrates, including steels, nickel-iron alloys, nickel-cobalt alloys and titanium alloys Provides detailed guidance on a wide variety of coating types, including those used against high temperature corrosion and oxidative degradation and thermal barrier coatings

High Temperature Corrosion

Aerospace Materials Handbook

Thermomechanical Fatigue Behavior of Materials Increasingly stringent environmental regulations and industry adoption of waste minimization guidelines have thus, stimulated the need for the development of recycling and reusing waste for metal recycling. Of the waste materials, this book provides an overview of waste materials in recycling and reusing along the mining, beneficiation, extraction, manufacturing and post-consumer value chain. This book reviews current status and future trends in the recycling and use of mineral and metal waste and also details the policy and legislation regarding the waste management, health and environmental impacts in the mining, beneficiation, metal extraction and manufacturing processes. This book is a useful reference for engineers and researchers in industry, policymakers and legislators in governance, and academics on the current status and future trends in the recycling and reuse of mineral and metal waste. Some of the key features of the book are as follows: Holistic approach to waste generation, recycling and reusing along the minerals and metals extraction. Detailed overview of metallurgical waste generation. Practical examples with complete flow sheets, techniques and interventions on waste management. Integrates the technical issues related to efficient resources utilization with the policy and regulatory framework. Novel approach to addressing future commodity shortages.

High Temperature Corrosion of Advanced Materials and Protective Coatings

Materials & Components in Fossil Energy Applications The first of many important works featured in CRC Press' Metals and Alloys Encyclopedia Collection, the Encyclopedia of Iron, Steel, and Their Alloys covers all the fundamental, theoretical, and application-related aspects of the metallurgical science, engineering, and technology of iron, steel, and their alloys. This Five-Volume Set addresses topics such as extractive metallurgy, powder metallurgy and processing, physical metallurgy, production engineering, corrosion engineering, thermal processing, metalworking, welding, iron- and steelmaking, heat treating, rolling, casting, hot and cold forming, surface finishing and coating, crystallography, metallurgy, computational metallurgy, metal-matrix composites, intermetallics, nano- and micro-structured metals and alloys, nano- and micro-processing effects, scouting of sources, and mining. A valuable reference for materials scientists and engineers, chemists, manufacturers, miners, researchers, and students, this must-have encyclopedia: Provides extensive coverage of properties and recommended practices Includes a wealth of helpful charts, nomograms, and figures Contains cross referencing for quick and easy search Each entry is written by a subject-matter expert and reviewed by an international panel of renowned researchers from academia, government, and industry. Also Available Online This Taylor & Francis encyclopedia is also available through online subscription, offering a variety of extra benefits for researchers, students, and librarians, including: Citation tracking and alerts Active reference linking Saved searches and marked lists HTML and PDF format options Contact Taylor and Francis for more information or to inquire about subscription options and print/online combination packages. US: (Tel) 1.888.318.2367; (E-mail) e-reference@taylorandfrancis.com International: (Tel) +44 (0) 20 7017 6062; (E-mail) online.sales@tandf.co.uk

Nanotechnology Whether an airplane or a space shuttle, a flying machine requires advanced materials to provide a strong, lightweight body and a powerful engine that functions at high temperature. The Aerospace Materials Handbook examines these materials, covering traditional superalloys as well as more recently developed light alloys. Capturing state-of-the-art developments in materials research for aeronautical and aerospace applications, this book provides a timely reference for both newcomers and veteran researchers in the field. The chapters address developments in bulk materials, coatings, traditional materials, and new materials, beginning with an overview of superalloys, including nickel-, nickel-iron-, and cobalt-based superalloys, the text covers machining, laser cladding and alloying, corrosion performance, high-temperature oxidation, thermal spraying, and nanostructured coatings. It also includes four categories of composites used in aerospace: metal matrix, polymer, carbon nanotube-reinforced polymer, and self-healing composites. The text describes preparation, processing, and fatigue of lightweight magnesium alloys, as well as an exciting new class of materials—aerogels. This book brings readers to the cutting edge of research in materials for aerospace and aeronautics. It provides an entry point into this field and presents details to stimulate future research. This unique, up-to-date resource offers knowledge to enable practitioners to develop faster, more efficient, and more reliable air- and spacecraft.

Materials for High-Temperature Fuel Cells This proceedings volume gathers selected papers presented at the Chinese Materials Conference 2017 (CMC2017), held in Yinchuan City, Ningxia, China, on July 06-12, 2017. This book covers a wide range of powder metallurgy, high performance aluminum alloys, high performance titanium & titania alloys, superalloys, metal matrix composites, space materials science and technology, rare metals, refractory metals and their applications, advanced ceramics materials, nanostructured metals and alloys. The Chinese Materials Conference (CMC) is the most important serial conference of the Chinese Materials Research Society (CMRS) and has been held each year since the early 1990s. The 2017 installment included 37 Symposium covering four fields: Advances in energy and environmental materials; High performance structural materials; Fundamental research on materials; and Advanced functional materials. More than 5500 participants attended the congress, and the organizers received more than 700 technical papers. Based on the recommendations of symposium organizers and after peer reviewing, 490 papers have been included in the present proceedings, which showcase the latest original research results in the field of materials, achieved by more than 300 research groups at various universities and research institutes.

Proceedings of the Symposium on High Temperature Corrosion and Materials Chemistry Nanotechnology: Advances and Real-Life Applications offers a comprehensive reference text about advanced concepts and applications in the field of nanotechnology. The text—written by researchers practicing in the field—presents a detailed discussion of key concepts including nanomaterials and their synthesis, fabrication and characterization of nanomaterials, carbon-based nanomaterials, nano-bio interface, and nanoelectronics. The applications of...
Oxide Scale Behavior in High Temperature Metal Processing Reviews the science and engineering of high-temperature corrosion and provides guidelines for selecting the best materials for an array of system processes High temperature corrosion (HTC) is a widespread problem in an array of industries, including power generation, aerospace, automotive, and mineral and chemical processing, to name a few. This book provides engineers, physicists, chemists, and scientists with a balanced presentation of all relevant basic science and engineering aspects of high-temperature corrosion. It covers most HTC types, including oxidation, sulfidation, nitridation, molten salts, fuel-ash corrosion, H2S/H2 corrosion, molten fluoride/HF corrosion, and carburization. It also provides corrosion data essential for making the appropriate choices of candidate materials for high-temperature service in process conditions. A form of corrosion that does not require the presence of liquids, high-temperature corrosion arises due to the interaction at high temperatures of gases, liquids, or solids with materials. HTC is a subject of increasing importance in many areas of science and engineering, and students, researchers, and engineers need to be aware of the nature of the processes that occur in high-temperature materials and equipment in common use today, especially in the chemical, gas, petroleum, electric power, metal manufacturing, automotive, and nuclear industries. Provides engineers and scientists with the essential data needed to make the most informed decisions on materials selection Includes up-to-date information accompanied by more than 1,000 references, 80% of which from within the past fifteen years Includes details on systems of critical engineering importance, especially the corrosion induced by low-energy radionuclides Includes practical guidelines for testing and research in HTC, along with both the European and International Standardization Organizations for high-temperature corrosion data. Offering balanced, in-depth coverage of the fundamental science behind and engineering of HTC, High Temperature Corrosion: Fundamentals and Engineering is a valuable resource for academic researchers, students, and professionals in the material sciences, solid state physics, solid state chemistry, electrochemistry, metallurgy, and mechanical, chemical, and structural engineers.

Advances in Materials Technology for Fossil Power Plants High Temperature Mechanical Behavior of Ceramic Composites provides an up-to-date comprehensive coverage of the mechanical behavior of ceramic matrix composites at elevated temperatures. Topics include both short-term behavior (strength, fracture toughness and R-curve behavior) and long-term behavior (creep, creep-fatigue, delayed failure and lifetime). Emphasis is on a review of fundamentals and on the mechanics and mechanisms underlying properties. This is the first time that complete information of elevated temperature behavior of ceramic composites has ever been compacted together in a single volume. Of particular importance is that each chapter, written by internationally recognized experts, includes an overview of the advances in the field since the previous edition. The book provides an in-depth perspective. Shanti Nair is Associate Professor at the Department of Mechanical Engineering at the University of Massachusetts at Amherst. Karl Jakus is Professor at the University of Massachusetts at Amherst.

Structural Intermetallics and Intermetallic Matrix Composites This Springer Handbook of Metrology and Testing presents the principles of Metrology – the science of measurement – and the methods and techniques of Testing – determining the characteristics of a given product – as they apply to chemical and microstructural analysis, and to the measurement and testing of materials properties and performance, including modelling and simulation. The principal motivation for this Handbook stems from the increasing demands of technology for measurement results that can be used globally. Measurements within a local laboratory or manufacturing facility must be able to be reproduced accurately anywhere in the world. The book integrates knowledge from basic sciences and engineering disciplines, compiled by experts from internationally known metrology and testing institutions, and academe, as well as from industry, and conformity-assessment and accreditation bodies. The Commission of the European Union has expressed this as there is no science without measurements, no quality without testing, and no global markets without standards.

High-Entropy Alloys Materials for high-pressure turbine blades must be able to operate in the high-temperature gases (above 1000 C) emerging from the combustion chamber. Accordingly, the development of nickel-based superalloys has been constantly motivated by the need to have improved engine efficiency, reliability and service lifetime under the harsh conditions imposed by the turbine environment. However, the melting point of nickel (1455 C) provides a natural ceiling for the temperature capability of nickel-based superalloys. Thus, surface-engineered turbine components with modified diffusion coatings and overlay coatings are used. These coatings are capable of forming a compact and adherent oxide scale, which greatly improves the further transients between the high-temperature gases and the underlying metal and thus reducing attack by the atmosphere. Typically, these coatings contain [beta]-NiAl as a principal constituent phase in order to have sufficient aluminum content to form an Al2O3 scale at elevated temperatures. The drawbacks to the currently-used [beta]-based coatings, such as phase instabilities, and forms induced by the substrate and the phase instability, are major motivations in this study to seek next-generation coatings. The high-temperature oxidation resistance of novel Pt + Hf-modified [gamma]-Ni + [gamma]-N3Al-based alloys and coatings were investigated in this study. Both early-stage and 4-days isothermal oxidation behavior of single-phase [gamma]-Ni and [gamma]-N3Al alloys were assessed by examining the weight changes, oxide-scale structures, and elemental concentration profiles through the scales and subsurface alloy regions. It was found that Pt promotes AL2O3 formation by suppressing the NiO growth on both [gamma]-Ni and [gamma]-N3Al single-phase alloys. This effect increases with increasing Pt content. Moreover, Pt exhibits this effect even at lower temperatures (~970 C) in the very early stage of oxidation. It was also inferred that Pt enhances the diffusive flux of aluminum from the substrate to the scale/alloy interface. Relative to very low levels of hafnium addition to Pt-free [gamma]-N3Al increased the extent of external NiO formation due to non-protective HfO2 formation. Accordingly, this effect intensified with increasing Hf content from 0.2 to 0.5 at.%. Thermomechanical Behaviour of Materials Encyclopedia of Iron, Steel, and Their Alloys (Online Version) Nickel Base Single Crystals Across Length
Oxide Scale Behavior in High Temperature Metal Processing Fills a Prominent Gap in a Significant Area of Intermetallics Presenting a comprehensive overview of structural intermetallics (the most important class of intermetallics), Structural Intermetallics and Intermetallic Matrix Composites is a reference written with the beginning student as well as the practicing professional in mind. Utilizing the author’s more than two decades of experience working on silicides and teaching a course on advanced materials, this text addresses the fundamental aspects related to structure, mechanical behavior, and the oxidation resistance of selected intermetallics and their composites. In addition to covering the structure and properties of selected intermetallics, the text places special emphasis on composite intermetallics and specifically focuses on select aluminides and silicides. It reviews existing literature on select structural silicides and aluminides, considers possible applications on the basis of the attractive properties of aluminides and silicides, and also factors in future directions of research. Fundamental aspects include thermodynamic principles, phase diagrams and crystal structures, processing methods, deformation and fracture mechanisms of ordered intermetallics, and oxidation behavior with mechanisms for protection against environmental degradation. Comprising nine chapters, this text: Explores the state-of-the-art accomplishments in this area Considers further research related to the topic Examines further innovations applying these materials An up-to-date introduction to structural intermetallics, Structural Intermetallics and Intermetallic Matrix Composites helps readers grasp the complexities of the structure of intermetallics and their effect on various physical and mechanical properties. It also highlights the recent state of development in the field.

High Temperature Oxidation Behavior of Gamma-Ni+gamma‘-Ni3Al Alloys and Coatings Modified with Pt and Reactive Elements This book is a printed edition of the Special Issue “Advances in Plastic Forming of Metals” that was published in Metals

High Temperature Corrosion and Materials Chemistry This book aims to show how tribological concepts can be applied in order to improve manufacturing technology in modern industry. It can be used as a guide book for engineering students or a reference useful for academics in the fields of tribology, manufacturing, materials and mechanical engineering.

High-Temperature Oxidation and Corrosion 2010 Intermetallics is concerned with all aspects of ordered chemical compounds between two or more metals and notably with their applications. This book covers new and important research on the crystal chemistry and bonding theory of intermetallics; determination and analysis of phase diagrams; the nature of superlattices, antiphase domains and order-disorder transitions; the geometry and dynamics of dislocations and related defects in intermetallics; theory and experiments relating to flow stress, work-hardening, fatigue and creep; response of deformed intermetallics to annealing; magnetic and electrical properties of intermetallics; structure and properties of grain and interphase boundaries; the effect of deviations from stoichiometry on physical and mechanical properties; crystallisation of intermetallics from the melt or amorphous precursors.

Non-Destructive Evaluation of Corrosion and Corrosion-assisted Cracking

Nickel Base Single Crystals Across Length Scales

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