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Materials Engineering and Science - Omar S. Dahham 2023-05-05
Selected peer-reviewed extended articles based on abstracts presented at the 5th International Conference on Materials Engineering and Science (IConMEAS 2022) Aggregated Book

Advances in Mechanical and Energy Technology - Sanjay Yadav 2022-06-20
This book presents the select proceedings the 2nd International Conference on Mechanical and

Energy Technologies (ICMET 2021). The broad range of topics and issues covered are bulk deformation processes and sheet metal forming, composites, ceramics, and polymers processing, corrosion, heat treatment, microstructure and materials properties, energy materials, failure and fracture mechanics, friction, wear, tribology, and surface engineering, functionally graded materials, cellular materials, low friction and corrosion resistive materials for energy applications, lubricants and lubrication, machinability and formability of materials, material science and engineering, and materials for energy storage. This book will be useful for students, researchers, and professionals working in the areas of mechanical and industrial engineering, energy technologies, and allied fields.

The Advances in Joining Technology - Mokhtar Awang 2018-05-22

This volume presents selected papers from the 3rd International Conference on Mechanical, Manufacturing and Process Plant Engineering (ICMMPE 2017) which was in Penang, Malaysia, 22nd–23rd November 2017. The proceedings discuss genuine problems covering various topics of mechanical, manufacturing, and Process Plant engineering.

Current Trends in Friction Stir Welding (FSW) and Friction Stir Spot Welding (FSSW) - Mukuna Patrick Mubiayi 2018-06-14

This book provides an overview of friction stir welding and friction stir spot welding with a focus on aluminium to aluminium and aluminium to copper. It also discusses experimental results for friction stir spot welding between aluminium and copper, offering a good foundation for researchers wishing to conduct more investigations on FSSW Al/Cu. Presenting full methodologies for manufacturing and case studies on FSSW Al/Cu, which can be duplicated and used for industrial purposes, it also provides a starting point for researchers and experts in the field to investigate the FSSW process in

detail. A variant of the friction stir welding process (FSW), friction stir spot welding (FSSW) is a relatively new joining technique and has been used in a variety of sectors, such as the automotive and aerospace industries. The book describes the microstructural evolution, chemical and mechanical properties of FSW and FSSW, including a number of case studies.

Advanced Coating Materials - Liang Li 2018-12-06

Provides a comprehensive, yet practical source of reference, and excellent foundation for comparing the properties and performance of coatings and selecting the most suitable materials based on specific service needs and environmental factors. Coating technology has developed significant techniques for protecting existing infrastructure from corrosion and erosion, maintaining and enhancing the performance of equipment, and provided novel functions such as smart coatings greatly benefiting the medical device, energy, automotive and construction industries. The mechanisms, usage, and manipulation of cutting-edge coating methods are the focus of this book. Not only are the working mechanisms of coating materials explored in great detail, but also craft designs for further optimization of more uniform, safe, stable, and scalable coatings. A group of leading experts in different coating technologies demonstrate their main applications, identify the key bottlenecks, and outline future prospects. Advanced Coating Materials broadly covers the coating techniques, including cold spray, plasma vapor deposition, chemical vapor deposition, sol–gel method, etc., and their significant applications in microreactor technology, super(de)wetting, joint implants, electrocatalyst, etc. Numerous kinds of coating structures are addressed, including nanosize particles, biomimicry structures, metals and complexed materials, along with the environmental and human compatible biopolymers resulting from microbial activities.

This state-of-the-art book is divided into three parts: (1) Materials and Methods: Design and Fabrication, (2) Coating Materials: Nanotechnology, and (3) Advanced Coating Technology and Applications.

Resistance Welding - Hongyan Zhang 2011-12-13

Drawing on state-of-the-art research results, Resistance Welding: Fundamentals and Applications, Second Edition systematically presents fundamental aspects of important processes in resistance welding and discusses their implications on real-world welding applications. This updated edition describes progress made in resistance welding research and

Advances in Welding Technologies for Process Development - Jaykumar Vora 2019-02-22

Within manufacturing, welding is by far the most widely used fabrication method used for production, leading to a rise in research and development activities pertaining to the welding and joining of different, similar, and dissimilar combinations of the metals. This book addresses recent advances in various welding processes across the domain, including arc welding and solid-state welding process, as well as experimental processes. The content is structured to update readers about the working principle, predicaments in existing process, innovations to overcome these problems, and direct industrial and practical applications. Key Features: Describes recent developments in welding technology, engineering, and science Discusses advanced computational techniques for procedure development Reviews recent trends of implementing DOE and meta-heuristics optimization techniques for setting accurate parameters Addresses related theoretical, practical, and industrial aspects Includes all the aspects of welding, such as arc welding, solid state welding, and weld overlay

Transactions on Intelligent Welding

Manufacturing - Shanben Chen 2020-01-11
The primary aim of this volume is to provide researchers and engineers from both academic and industry with up-to-date coverage of new results in the field of robotic welding, intelligent systems and automation. The book is mainly based on papers selected from the 2019 International Workshop on Intelligentized Welding Manufacturing (IWIWM'2019) in USA. The articles show that the intelligentized welding manufacturing (IWM) is becoming an inevitable trend with the intelligentized robotic welding as the key technology. The volume is divided into four logical parts: Intelligent Techniques for Robotic Welding, Sensing of Arc Welding Processing, Modeling and Intelligent Control of Welding Processing, as well as Intelligent Control and its Applications in Engineering.

Advanced Materials □ XV - M. Muneeb Asim 2018-09-05
This book is the proceedings of the 15th International Symposium on Advanced Materials (ISAM-2017, October 16-20, 2017, Islamabad, Pakistan) and contains the selected peer reviewed papers which reflect recent achievements in the field of materials sciences and technologies of their processing and synthesis. We hope that this collection will be useful and interesting for the wide range of researchers and engineers.

Proceedings of SAE-China Congress 2015: Selected Papers - China Society of Automotive Engineers 2015-11-30
These proceedings gather outstanding papers submitted to the 2015 SAE-China Congress, the majority of which are from China, the biggest car maker as well as most dynamic car market in the world. The book covers a wide range of automotive topics, presenting the latest technical achievements in the industry. Many of the approaches presented can help technicians to solve the practical problems that most affect their daily work.

Confluence of Multidisciplinary Sciences for Polymer Joining - S. Arungalai Vendan 2018-12-17

This book offers a systematic overview of polymer joining and highlights the experimental and numerical work currently being pursued to devise possible strategies to overcome the technical issues. It also covers the fundamentals of polymers, the corresponding joining processes and related technologies. A chapter on the extrapolation of finite element analysis (FEA) for forecasting the deformation and temperature distribution during polymer joining is also included. Given its breadth of coverage, the book will be of great interest to researchers, engineers and practitioners whose work involves polymers.

Proceedings of International Conference on Intelligent Manufacturing and Automation - Hari Vasudevan 2018-11-04

This book presents the outcomes of the International Conference on Intelligent Manufacturing and Automation (ICIMA 2018) organized by the Departments of Mechanical Engineering and Production Engineering at Dwarkadas J. Sanghvi College of Engineering, Mumbai, and the Indian Society of Manufacturing Engineers. It includes original research and the latest advances in the field, focusing on automation, mechatronics and robotics; CAD/CAM/CAE/CIM/FMS in manufacturing; product design and development; DFM/DFA/FMEA; MEMS and Nanotechnology; rapid prototyping; computational techniques; industrial engineering; manufacturing process management; modelling and optimization techniques; CRM, MRP and ERP; green, lean, agile and sustainable manufacturing; logistics and supply chain management; quality assurance and environment protection; advanced material processing and characterization; and composite and smart materials.

Proceedings of the 12th International Conference on Measurement and Quality Control - Cyber Physical Issue - Vidosav D. Majstorovic 2019-05-03

This book gathers the proceedings of the 12th International Conference on Measurement and Quality Control – Cyber Physical Issues (IMEKO TC 14 2019), held in Belgrade, Serbia, on 4–7 June 2019. The event marks the latest in a series of high-level conferences that bring together experts from academia and industry to exchange knowledge, ideas, experiences, research findings, and information in the field of measurement of geometrical quantities. The book addresses a wide range of topics, including: 3D measurement of GPS characteristics, measurement of gears and threads, measurement of roughness, micro- and nano-metrology, laser metrology for precision measurements, cyber physical metrology, optical measurement techniques, industrial computed tomography, multisensor techniques, intelligent measurement systems, evaluating measurement uncertainty, dimensional management in industry, product quality assurance methods, and big data analytics. By providing updates on key issues and highlighting recent advances in measurement and quality control, the book supports the transfer of vital knowledge to the next generation of academics and practitioners.

Handbook of Research on Predictive Modeling and Optimization Methods in Science and Engineering - Kim, Dookie 2018-06-15

The disciplines of science and engineering rely heavily on the forecasting of prospective constraints for concepts that have not yet been proven to exist, especially in areas such as artificial intelligence. Obtaining quality solutions to the problems presented becomes increasingly difficult due to the number of steps required to sift through the possible solutions, and the ability to solve such problems relies on the recognition of patterns and the categorization of data into specific sets. Predictive modeling and

optimization methods allow unknown events to be categorized based on statistics and classifiers input by researchers. The Handbook of Research on Predictive Modeling and Optimization Methods in Science and Engineering is a critical reference source that provides comprehensive information on the use of optimization techniques and predictive models to solve real-life engineering and science problems. Through discussions on techniques such as robust design optimization, water level prediction, and the prediction of human actions, this publication identifies solutions to developing problems and new solutions for existing problems, making this publication a valuable resource for engineers, researchers, graduate students, and other professionals.

Friction Stir Welding and Processing XI - Yuri Hovanski 2021-02-16

This collection presents fundamentals and the current status of friction stir welding (FSW) and solid-state friction stir processing of materials, and provides researchers and engineers with an opportunity to review the current status of the friction stir related processes and discuss the future possibilities. Contributions cover various aspects of friction stir welding and processing including their derivative technologies. Topics include but are not limited to: • derivative technologies • high-temperature lightweight applications • industrial applications • dissimilar alloys and/or materials • controls and nondestructive examination • simulation • characterization

Trends in Manufacturing Processes - Inderdeep Singh 2019-09-10

This book comprises select proceedings of the International Conference on Futuristic Trends in Materials and Manufacturing (ICFTMM 2018). The volume covers current research findings in conventional and non-conventional manufacturing processes. Different fabrication processes of polymer based materials and advanced materials are discussed in this book.

In addition, the book also discusses computer based manufacturing processes, and sustainable and green manufacturing technologies. The contents of this book will be useful for students, academicians, and researchers working in the field of manufacturing related fields.

Advanced Welding and Deforming - Kapil Gupta 2021-04-17

Advanced Welding and Deforming explains the background theory, working principles, technical specifications, and latest developments on a wide range of advanced welding-joining and deforming techniques. The book's subject matter covers manufacturing, with chapters specifically addressing remanufacturing and 3D printing applications. Drawing on experts in both academia and industry, coverage addresses theoretical developments as well as practical improvements from R&D. By presenting over 35 important processes, from plasma arc welding to nano-joining and hybrid friction stir welding, this is the most complete guide to this field available. This unique guide will allow readers to compare the characteristics of different processes, understand how they work, and create parameters for their effective implementation. As part of a 4 volume set entitled Handbooks in Advanced Manufacturing, this series also includes volumes on Advanced Machining and Finishing, Additive Manufacturing and Surface Treatment, and Sustainable Manufacturing Processes. Provides theory, operational parameters, and the latest developments in over 35 different processes Addresses new welding technologies such as additive manufacturing using wire and arc, as well as the latest developments in more traditional applications Introduces basic concepts in welding, joining and deformation in three introductory chapters, thus helping readers with a range of backgrounds engage with the subject matter

Advances in Manufacturing Engineering - Seyed Sattar Emamian 2020-08-31

This book presents selected papers from the 5th

International Conference on Mechanical, Manufacturing and Plant Engineering (ICMMPE 2019), held in Kuala Lumpur, Malaysia. It highlights the latest advances in the area, brings together researchers and professionals in the field and provides a valuable platform for exchanging ideas and fostering collaboration. Joining technologies could be change to manufacturing technologies. Addressing real-world problems concerning joining technologies that are at the heart of various manufacturing sectors, the respective papers present the outcomes of the latest experimental and numerical work on problems in soldering, arc welding and solid-state joining technologies. technologies. technologies. technologies. technologies. technologies. technologies. technologies. technologies. technologies. technologies.

Techno-Societal 2016 - Prashant M. Pawar 2017-06-16

This volume originates from the proceedings of a multidisciplinary conference, Techno-Societal 2016 in Maharashtra, India, that brings together faculty members of various engineering colleges to solve Indian regional relevant problems under the guidance of eminent researchers from various reputed organizations. The focus is on technologies that help develop and improve society, in particular on issues such as the betterment of differently abled people, environment impact, livelihood, rural employment, agriculture, healthcare, energy, transport, sanitation, water, education. This conference aims to help innovators to share their best practices or products developed to solve specific local problems which in turn may help the other researchers to take inspiration to solve problems in their region. On the other hand, technologies proposed by expert researchers may find applications in different regions. This back and forth process for local-global interaction will help in solving local problems by global approach and help in solving

global problems by improving local conditions.

Numerical Optimization in Engineering and Sciences - Debashis Dutta 2020-04-07

This book presents select peer-reviewed papers presented at the International Conference on Numerical Optimization in Engineering and Sciences (NOIEAS) 2019. The book covers a wide variety of numerical optimization techniques across all major engineering disciplines like mechanical, manufacturing, civil, electrical, chemical, computer, and electronics engineering. The major focus is on innovative ideas, current methods and latest results involving advanced optimization techniques. The contents provide a good balance between numerical models and analytical results obtained for different engineering problems and challenges. This book will be useful for students, researchers, and professionals interested in engineering optimization techniques.

Advances in Industrial and Production Engineering - Rakesh Kumar Phanden 2021-03-21

This book comprises the select proceedings of the 2nd International Conference on Future Learning Aspects of Mechanical Engineering (FLAME) 2020. In particular, this volume discusses different topics of industrial and production engineering such as sustainable manufacturing processes, logistics, Industry 4.0 practices, circular economy, lean six sigma, agile manufacturing, additive manufacturing, IoT and Big Data in manufacturing, 3D printing, simulation, manufacturing management and automation, surface roughness, multi-objective optimization and modelling for production processes, developments in casting, welding, machining, and machine tools. The contents of this book will be useful for researchers as well as industry professionals.

Intelligent Manufacturing and Energy Sustainability - A. N. R. Reddy 2021-12-10

This book includes best selected, high-quality research papers presented at the International

Conference on Intelligent Manufacturing and Energy Sustainability (ICIMES 2021) held at the Department of Mechanical Engineering, Malla Reddy College of Engineering & Technology (MRCET), Maisammaguda, Hyderabad, India, during June 18-19, 2021. It covers topics in the areas of automation, manufacturing technology and energy sustainability and also includes original works in the intelligent systems, manufacturing, mechanical, electrical, aeronautical, materials, automobile, bioenergy and energy sustainability.

AWS C1.1-66 - American Welding Society 1996

Advances in Manufacturing Technology and Management - Ranganath M. Singari 2022-11-10
This book presents the select peer-reviewed proceeding of the International Conference on Advanced Production and Industrial Engineering (ICAPIE) – 2021 held at Delhi Technological University. It covers recent trends in various fields of mechanical engineering. The broad range of topics and issues covered include mechanical system engineering, materials engineering, micro-machining, renewable energy, industrial engineering and additive manufacturing. This book will be useful for students, researchers and professionals working in the area of mechanical and allied engineering discipline.

Computational Concepts in Simulation of Welding Processes - Reza Beygi 2022-03-22
This book introduces basic concepts related to computer-aided simulation of welding and prepares the reader to perform the simulation of welding by commercial simulation software. It focuses on conceptualizing the physics of welding, heat transfer, stress development and microstructure development in welding. This book helps the reader to implement these concepts in any commercial software to simulate the welding process according to their own requirement.

Handbook of Smart Materials, Technologies, and

Devices - Chaudhery Mustansar Hussain 2022-11-09

This handbook brings together technical expertise, conceptual background, applications, and societal aspects of Industry 4.0: the evolution of automation and data exchange in fabrication technologies, materials processing, and device manufacturing at both experimental and theoretical model scales. The book assembles all the aspects of Industry 4.0, starting from the emergence of the concept to the consequences of its progression. Drawing on expert contributors from around the world, the volume details the technologies that sparked the fourth revolution and illustrates their characteristics, potential, and methods of use in the industrial and societal domains. In addition, important topics such as ethics, privacy and security are considered in a reality where all data is shared and saved remotely. The collection of contribution serve a very broad audience working in the fields of science and engineering, chemical engineering, materials science, nanotechnology, energy, environment, green chemistry, sustainability, electrical and electronic engineering, solid-state physics, surface science, aerosol technology, chemistry, colloid science, device engineering, and computer technology. This handbook ideal reference libraries in universities and industrial institutions, government and independent institutes, individual research groups and scientists.

Experiments and Simulation for 6061-T6 Aluminum Alloy Resistance Spot Welded Lap Joints - 2012

This comprehensive study is the first to quantify the fatigue performance, failure loads, and microstructure of resistance spot welding (RSW) in 6061-T6 aluminum (Al) alloy according to welding parameters and process sensitivity. The extensive experimental, theoretical and simulated analyses will provide a framework to optimize the welding of lightweight structures

for more fuel-efficient automotive and military applications. The research was executed in four primary components. The first section involved using electron back scatter diffraction (EBSD) scanning, tensile testing, laser beam profilometry (LBP) measurements, and optical microscopy(OM) images to experimentally investigate failure loads and deformation of the Al-alloy resistance spot welded joints. Three welding conditions, as well as nugget and microstructure characteristics, were quantified according to predefined process parameters. Quasi-static tensile tests were used to characterize the failure loads in specimens based upon these same process parameters. Profilometer results showed that increasing the applied welding current deepened the weld imprints. The EBSD scans revealed the strong dependency between the grain sizes and orientation function on the process parameters. For the second section, the fatigue behavior of the RSW'ed joints was experimentally investigated. The process optimization included consideration of the forces, currents, and times for both the main weld and post-heating. Load control cyclic tests were conducted on single weld lap-shear joint coupons to characterize the fatigue behavior in spot welded specimens. Results demonstrate that welding parameters do indeed significantly affect the microstructure and fatigue performance for these welds. The third section comprised residual strains of resistance spot welded joints measured in three different directions, denoted as in-plane longitudinal, in-plane transversal, and normal, and captured on the fusion zone, heat affected zone and base metal of the joints. Neutron diffraction results showed residual stresses in the weld are approximately 40% lower than the yield strength of the parent material, with maximum variation occurring in the vertical position of the specimen because of the orientation of electrode clamping forces that produce a non-uniform solidification pattern. In

the final section a theoretical continuum modeling framework for 6061-T6 aluminum resistance spot welded joints is presented.

Next Generation Materials and Processing Technologies - Swarup Bag 2021

This book presents the select proceedings of Conference on Research and Developments in Material Processing, Modelling and Characterization (RDMPMC 2020). It highlights the new technologies developed in the generation of rational materials for various applications with tailored properties. It covers fundamental research in emerging materials which includes biomaterials, composites, ceramics, functionally graded materials, energy materials, thin film materials, nanomaterials, nuclear materials, intermetallic, high strength materials, structural materials, super alloys, shape memory alloys and thermally enhanced materials. It includes the numerical modeling and computer simulation to investigate the properties and structure of materials. Few of the most relevant manufacturing techniques highlighted in this book are welding, coating, additive manufacturing, laser-based manufacturing, advanced machining processes, casting, forming and micro and nanoscale manufacturing processes. Given its contents, this book is beneficial to students, researchers and industry professionals. .

Innovative Product Design and Intelligent Manufacturing Systems - BBVL. Deepak 2020-03-13

This book gathers selected research articles from the International Conference on Innovative Product Design and Intelligent Manufacturing System (ICIPDIMS 2019), held at the National Institute of Technology, Rourkela, India. The book discusses latest methods and advanced tools from different areas of design and manufacturing technology. The main topics covered include design methodologies, industry 4.0, smart manufacturing, and advances in robotics among others. The contents of this book

are useful for academics as well as professionals working in industrial design, mechatronics, robotics, and automation.

Recent Advances in Materials Technologies - K. Rajkumar 2022-09-19

This book presents the select proceedings of the first International Conference on Energy and Materials Technologies (ICEMT) 2021, organized by the Department of Mechanical Engineering, Sri Sivasubramaniya Nadar College of Engineering, Kalavakkam, India. It covers the recent technologies in two broad thematic areas: energy and materials. Various topics covered in this book include advanced materials and characterization, mechanical behavior of materials, nanomaterials and nanotechnology, biomaterials, composite materials, environmental-friendly materials, structural materials, advances in aerospace technology, and advanced materials and manufacturing. The book is useful for students, researchers, and professionals in the area of mechanical engineering, especially various domains of materials.

Natural Fiber Reinforced Vinyl Ester and Vinyl Polymer Composites - S.M. Sapuan 2018-06-15

Natural Fiber Reinforced Vinyl Ester and Vinyl Polymer Composites: Characterization, Properties and Applications discusses recent advances on the development, characterization and application of natural fiber vinyl ester and vinyl polymers composites. Various types of vinyl ester and vinyl based polymers, such as poly(vinyl chloride) (PVC), low and high density polyethylene (LDPE and HDPE), polypropylene (PP), polyvinyl alcohol (PVA) and polyvinyl acetate (PVAc) are discussed. Chapters focus on different composite fabrication processes, such as compression moulding, hand lay-up, and pultrusion processes. Key themes covered include the properties and characterization of vinyl ester and vinyl polymers composites reinforced by natural fibers. The effect of fiber

treatment and coupling agents on mechanical and physical properties of these materials is also evaluated. In addition to a determination of physical and mechanical properties, studies on thermal, degradation, swelling behavior, and the morphological properties of natural fiber reinforced vinyl ester and vinyl polymer composites is also presented. Presents the importance of vinyl ester and vinyl-based polymers as matrices in natural fiber composites Provides a detailed and comprehensive review on the development, characterization and applications of natural fiber vinyl ester and vinyl polymers composites Looks at recent fabrication techniques and the mechanical properties of materials Contains contributions from leading experts in the field

Smart Electrical Grid System - Krishan Arora 2022-07-01

Smart technologies, such as artificial intelligence and machine learning, play a vital role in modeling, analysis, performance prediction, effective control, and utilization of smart energy systems. This book presents novel concepts in the development of smart cities and smart grids as well as discusses the technologies involved in producing efficient and economically feasible energy technologies around the world. It comprehensively covers important topics, including optimization methods for smart grids, power converters, smart meters, load frequency control, automatic generation control, and power electronics for smart grids. This book focuses mainly on three areas of electrical engineering: control systems, power electronics, and renewable resources, including artificial intelligence for the development of smart electrical grids. Key Features • Clarifies how the smart grid plays an important role in modern smart technologies • Introduces the basic concepts of modernization of smart grid with the assumption of basic knowledge of mathematics and power systems • Describes the structure of technologies based on Internet of Things (IoT),

which acts like a bridge to cover the gap between the physical and virtual worlds required for the realization of the smart grid • Includes practical examples of the smart grid and energy saving • Illustrates the integration of renewable energy sources with worked examples • Enables readers to engage with the immediate development of power systems by using smart approaches for future smart grids

International Proceedings on Advances in Soft Computing, Intelligent Systems and Applications - M. Sreenivasa Reddy 2017-12-28

The book focuses on the state-of-the-art technologies pertaining to advances in soft computing, intelligent system and applications. The Proceedings of ASISA 2016 presents novel and original work in soft computing, intelligent system and applications by the experts and budding researchers. These are the cutting edge technologies that have immense application in various fields. The papers discuss many real world complex problems that cannot be easily handled with traditional mathematical methods. The exact solution of the problems at hand can be achieved with soft computing techniques. Soft computing represents a collection of computational techniques inheriting inspiration from evolutionary algorithms, nature inspired algorithms, bio-inspired algorithms, neural networks and fuzzy logic.

Hot Cracking Phenomena in Welds II - Thomas Böllinghaus 2008-08-07

Failure of welded components can occur during service as well as during fabrication. Most common, analyses of the resistance of welded components against failure are targeted at crack avoidance. Such evaluations are increasingly carried out by modern weldability studies, i. e. considering interactions between the selected base and filler materials, structural design and welding process. Such weldability investigations are particularly targeted to prevent hot cracking, as one of the most common cracking phenomena occurring during weld fabrication.

To provide an international information and discussion platform to combat hot cracking, an international workshop on Hot Cracking Phenomena in Welds has been created, based on an initiative of the Institute for Materials and Joining Technology at the Otto-von-Guericke University in Magdeburg and the Division V. 5 – Safety of Joined Components at the Federal Institute for Materials Research and Testing (BAM) in Berlin, Germany. The first workshop was organized in Berlin under the topics mechanisms and phenomena, metallurgy and materials, modelling and simulations as well as testing and standardization. It consisted of 20 individual contributions from eight countries, which were compiled in a book that found a very ready market, not only in the welding community. As a consequence of increasing interest, it has been decided to establish the Workshop on Hot Cracking Phenomena in Welds as a regular event every three years embedded in the International Institute of Welding (IIW). Attached to the IIW Commission IX and II Spring intermediate meetings, the second workshop was organized in March 2007.

Proceedings of the International Conference on Advanced Mechanical Engineering, Automation, and Sustainable Development 2021 (AMAS2021) - Banh Tien Long 2022-05-03

This book presents selected, peer-reviewed proceedings of the International Conference on Advanced Mechanical Engineering, Automation and Sustainable Development 2021 (AMAS2021), held in the city of Ha Long, Vietnam, from November 4 to 7, 2021. AMAS2021 is a special meeting of the International Conference on Material, Machines and Methods for Sustainable Development (MMMS), with a strong focus on automation and fostering an overall approach to assist policy makers, industries, and researchers at various levels to position local technological development toward sustainable development.

The contributions published in this book stem from a wide spectrum of research, ranging from micro- and nanomaterial design and processing, to special applications in mechanical technology, environmental protection, green development, and climate change mitigation. A large group of contributions selected for these proceedings also focus on modeling and manufacturing of ecomaterials.

Materials Forming, Machining and Post Processing - Kapil Gupta 2019-06-27

This book provides a detailed understanding of various forming, machining, and post processing techniques. Working principle, process mechanism, salient features and latest developments are primarily focused. It presents some basic and specialized processes to produce quality engineered parts. This book also incorporates some investigations on modelling, simulation and optimization of the aforementioned processes to improve quality and performance, productivity, and sustainability.

Advanced Joining Processes - Lucas F. M. da Silva 2020-10-31

Advanced Joining Processes: Welding, Plastic Deformation, and Adhesion brings together a range of advanced thermal, mechanical, and chemical methods of joining, offering an up-to-date resource for those looking to understand and utilize the very latest techniques. Efficient joining techniques are critical to a range of innovative applications, with technology in constant development. The first section of the book provides in-depth information on advanced welding techniques, including friction stir, explosive, ultrasonic, laser, electron beam, and computational weld analysis and fatigue of structures. The second section highlights key developments in joining by plastic deformation, adhesive bonding, and hybrid joining. The coverage of each technique is supported by practical guidance, detailed analysis, and finite element simulations. This is an essential

reference for researchers and advanced students in joining, welding, adhesion, materials processing, mechanical engineering, plastics engineering, manufacturing, civil engineering, and automotive/aerospace engineering, as well as engineers, scientists, and R&D professionals, using joining, welding, and adhesion methods, across a range of industries. Presents the latest research findings and developments across welding, joining by plastic deformation, and adhesion Includes state-of-the-art methods, such as laser, ultrasonic and electron beam welding, hybrid joining, and the use of electromagnetic pulses Offers practical guidance, detailed analysis, and finite element simulations, for all techniques covered

Resistance Welding - Hongyan Zhang 2011-12-13

Drawing on state-of-the-art research results, Resistance Welding: Fundamentals and Applications, Second Edition systematically presents fundamental aspects of important processes in resistance welding and discusses their implications on real-world welding applications. This updated edition describes progress made in resistance welding research and practice since the publication of the first edition. New to the Second Edition: Significant addition of the metallurgical aspects of materials involved in resistance welding, such as steels, aluminum and magnesium alloys, zinc, and copper Electric current waveforms commonly used in resistance welding, including single-phase AC, single-phase DC, three-phase DC, and MFDC Magnesium welding in terms of cracking and expulsion The effect of individual welding parameters 2-D and 3-D lobe diagrams New materials for the ultrasonic evaluation of welds, including A-scan, B-scan, and in-line A-scan The book begins with chapters on the metallurgical processes in resistance spot welding, the basics of welding schedule selection, and cracking in the nugget and heat-affected zone of alloys. The next several chapters discuss commonly

conducted mechanical tests, the monitoring and control of a welding process, and the destructive and nondestructive evaluation of weld quality. The authors then analyze the mechanisms of expulsion—a process largely responsible for defect formation and other unwanted features—and explore an often overlooked topic in resistance welding-related research: the influence of mechanical aspects of welding machines. The final chapters explain how to numerically simulate a resistance welding process and apply statistical design and analysis approaches to welding research. To obtain a broad understanding of this area, readers previously had to scour large quantities of research on resistance welding and essential related subjects, such as statistical analysis. This book collects the necessary information in one source for students, researchers, and practitioners in the sheet metal industry. It thoroughly reviews state-of-the-art results in resistance welding research and gives you a solid foundation for solving practical problems in a scientific and systematic manner.

Joining Processes for Dissimilar and Advanced Materials - Pawan Kumar Rakesh 2021-11-13

Joining Processes for Dissimilar and Advanced Materials describes how to overcome the many challenges involved in the joining of similar and dissimilar materials resulting from factors including different thermal coefficients and melting points. Traditional joining processes are ineffective with many newly developed materials. The ever-increasing industrial demands for production efficiency and high-performance materials are also pushing this technology forward. The resulting emergence of advanced micro- and nanoscale material joining technologies, have provided many solutions to these challenges. Drawing on the latest research, this book describes primary and secondary processes for the joining of advanced materials such as metals and alloys,

intermetallics, ceramics, glasses, polymers, superalloys, electronic materials and composites in similar and dissimilar combinations. It also covers details of joint design, quality assurance, economics and service life of the product. Provides valuable information on innovative joining technologies including induction heating of metals, ultrasonic heating, and laser heating at micro- and nanoscale levels Describes the newly developed modelling, simulation and digitalization of the joining process Includes a methodology for characterization of joints

Numerical Modelling and Simulation of Metal Processing - Christof Sommitsch 2021-08-16 This book deals with metal processing and its numerical modelling and simulation. In total, 21 papers from different distinguished authors have been compiled in this area. Various processes are addressed, including solidification, TIG welding, additive manufacturing, hot and cold rolling, deep drawing, pipe deformation, and galvanizing. Material models are developed at different length scales from atomistic simulation to finite element analysis in order to describe the evolution and behavior of materials during thermal and thermomechanical treatment. Materials under consideration are carbon, Q&T, DP, and stainless steels; ductile iron; and aluminum, nickel-based, and titanium alloys. The developed models and simulations shall help to predict structure evolution, damage, and service behavior of advanced materials.