Laser Fabrication And Machining Of Materials By Narendra B Dahotre

Manufacturing and Industrial Engineering
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Advanced Methods of Machining
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Feasible Laser Parameters in Fabrication of MEMS Structures on Silicon
Laser Fabrication and Machining of Materials
сборник нау?ных трудов
with Research and Applications in Thermal Laser Processing
Additive and Subtractive Manufacturing of Composites
Comprehensive Materials Processing
Micro- and Nano-manufacturing
Modern Manufacturing Processes
Advances in Laser Materials Processing
5th International and 26th All India Manufacturing Technology, Design and Research Conference, AIMTDR 2014
30 October 2002, Brugge, Belgium
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Conventional and Non-conventional Processes
Research Advances
Practical Applications of Laser Ablation
Laser Cutting Guide for Manufacturing
Laser-Based Nano Fabrication and Nano Lithography

HALLIE PERKINS

Manufacturing and Industrial Engineering
Springer
This forward-thinking, practical book provides essential information on modern machining technology for industry with emphasis on the processes used regularly across several major industries. Machining technology presents great interest for many important industries including automotive, aeronautics, aerospace, renewable energy, moulds and dies, biomedical, and many others. Machining processes are manufacturing processes in which parts are shaped by the removal of unwanted material; these processes cover several stages and are usually divided into the following categories: cutting (involving single point or multipoint cutting tools); abrasive processes (including grinding and advanced machining processes, such as EDM (electrical discharge machining), LBM (laser-beam machining), AWJM (abrasive water jet machining) and USM (ultrasonic machining). Provides essential information on modern machining technology, with emphasis on the processes used regularly across several major industries Covers several processes and outlines their many stages Contributions come from a series of international, highly knowledgeable and well-respected experts
Comprehensive Materials Finishing
Springer
Laser machining technology has been used to demonstrate the ability to rapidly perform jobs on all aspects of ICF targets. Lasers are able to rapidly perform modifications and repairs to the gold metal parts on hohlraums, make cuts in the delicate polymer parts of the hohlraum, and drill holes in the capsules to enable them to be filled with fuel. Lasers investigated in this work include 193 nm ArF and 248 nm KrF excimers and 810 nm chirped-pulse amplification Ti:Sapphire lasers. The excimer lasers showed a definite advantage in drilling and machining of polymeric materials and the ultrashort infrared pulses of the Ti:Sapphire laser were far better for the gold structures.
Advances in Machining of Composite Materials Springer Science & Business

Media
One of the most frequently evolving areas of research is the utilization of lasers for micro-manufacturing and additive manufacturing purposes. The use of laser beam as a tool for manufacturing arises from the need for flexible and rapid manufacturing at a low-to-mid cost. Laser micro-machining provides an advantage over mechanical micro-machining due to the faster production times of large batch sizes and the high costs associated with specific tools. Laser based additive manufacturing enables processing of powder metals for direct and rapid fabrication of products. Therefore, laser processing can be viewed as a fast, flexible, and cost-effective approach compared to traditional manufacturing processes. Two types of laser processing techniques are studied: laser ablation of polymers for micro-channel fabrication and selective laser melting of metal powders. Initially, a feasibility study for laser-based micro-channel fabrication of poly(dimethylsiloxane) (PDMS) via experimentation is presented. In particular, the effectiveness of utilizing a nanosecond-pulsed laser as the energy source for laser ablation is studied. The results are analyzed statistically and a relationship between process parameters and micro-channel dimensions is established. Additionally, a process model is introduced for predicting channel depth. Model outputs are compared and analyzed to experimental results. The second part of this research focuses on a physics-based FEM approach for predicting the temperature profile and melt pool geometry in selective laser melting (SLM) of metal powders. Temperature profiles are calculated for a moving laser heat source to understand the temperature rise due to heating during SLM. Based on the predicted temperature distributions, melt pool geometry, i.e. the locations at which melting of the powder material occurs, is determined. Simulation results are compared against data obtained from experimental Inconel 625 test coupons fabricated at the National Institute for Standards & Technology via response surface methodology techniques. The main goal of this research is to develop a comprehensive predictive model with which the effect of powder material properties and laser process parameters on the built quality and integrity of SLM-produced parts can be better understood. By optimizing process parameters, SLM as an additive manufacturing technique is not only possible, but also practical and reproducible.
Toward Greener Production by Integrating Computer Simulation Springer Science & Business Media
Optical Measurements, Modeling, and Metrology represents one of eight volumes of technical papers presented at the Society for Experimental Mechanics Annual Conference on Experimental and Applied Mechanics, held at Uncasville, Connecticut, June 13-16, 2011. The full set of proceedings also includes volumes on Dynamic Behavior of Materials, Mechanics of Biological Systems and Materials, Mechanics of Time-Dependent Materials and Processes in Conventional and Multifunctional Materials; MEMS and Nanotechnology; Experimental and Applied Mechanics, Thermomechanics and Infra-Red Imaging, and Engineering Applications of Residual Stress.
Advanced Methods of Machining Springer Science & Business Media
This book covers the fundamental principles and physical phenomena behind laser-based fabrication and machining processes. It also gives an overview of their existing and potential applications. With laser machining an emerging area in various applications ranging from bulk machining in metal forming to micromachining and microstructuring, this book provides a link between advanced materials and advanced manufacturing techniques. The interdisciplinary approach of this text will help prepare students and researchers for the next generation of manufacturing.
Application of Lasers in Manufacturing Springer
Laser ablation refers to the phenomenon in which an intense laser beam irradiates the surface of a solid to induce instant local removal of atoms by a thermal or non-thermal mechanism. Through eight chapters of original research studies and literature reviews written by experts from the international scientific community, this book presents theoretical and experimental aspects of the laser ablation phenomenon for processing material including pulsed laser deposition of thin films, laser surface modification, laser machining and laser nanoparticle formation. It also includes a study of the dynamics of plasmas generated by laser ablation of multi-component materials and an overview of laser-induced breakdown spectroscopy (LIBS) and laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS) techniques for chemical analysis.
Feasible Laser Parameters in Fabrication of MEMS Structures on Silicon John Wiley & Sons
Advances in manufacturing and industrial engineering in terms of advanced and latest technologies are required nowadays to attend the accelerated demands of high quality, productivity, and sustainability simultaneously. This book fulfils the requirement by offering unique comprehensive chapters on advances in manufacturing and industrial engineering technologies with an emphasis on Industry 4.0. This book sheds light on advances in the field of manufacturing and industrial engineering for enhancement in productivity, quality, and sustainability. It comprehensively covers the recent developments, latest trends, research, and innovations being carried out. 3D printing, green manufacturing, computer integrated manufacturing, cloud manufacturing, intelligent condition monitoring, advanced forming, automation, supply chain optimization, and advanced manufacturing of composites are covered in this book. Industry 4.0 based technologies for mechanical and industrial engineering are also presented with both a theoretical and a practical focus. This book is written for students, researchers, professors, and engineers working in the fields of manufacturing, industrial, materials science, and mechanical engineering.
Laser Fabrication and Machining of Materials Woodhead Publishing Limited
This book is a printed edition of the Special Issue "Laser-Based Nano Fabrication and Nano Lithography" that was published in Nanomaterials
сборник нау?ных трудов Elsevier
Micromachining is used to fabricate three-dimensional microstructures and it is the foundation of a technology called Micro-Electro-Mechanical-Systems (MEMS). Bulk micromachining and surface micromachining are two major categories (among others) in this field. This book presents advances in micromachining technology. For this, we have gathered review articles related to various techniques and methods of micro/nano fabrications, like focused ion beams, laser ablation, and several other specialized techniques, from esteemed researchers and scientists around the world. Each chapter gives a complete description of a specific micromachining method, design, associate analytical works, experimental set-up, and the final fabricated devices, followed by many references related to this field of research available in other literature. Due to the multidisciplinary nature of this technology, the collection of articles presented here can be used by scientists and researchers in the disciplines of engineering, materials sciences, physics, and chemistry.
with Research and Applications in Thermal Laser Processing Newnes

Miniaturization and high precision are rapidly becoming a requirement for many industrial processes and products. As a result, there is greater interest in the use of laser microfabrication technology to achieve these goals. This book composed of 16 chapters covers all the topics of laser precision processing from fundamental aspects to industrial applications to both inorganic and biological materials. It reviews the sate of the art of research and technological development in the area of laser processing.

Additive and Subtractive Manufacturing of Composites BoD – Books on Demand

This book illuminates advanced cutting and joining processes, what they are used for, and the capabilities of these manufacturing techniques, especially in micro- and nano-fabrication. The authors illustrate the use of water jets and lasers that can be used to cut highly complex shapes without leaving burrs of heat affected zones, as well as friction stir welding processes that were not possible in the past. Rounding out their examination, the authors describe in detail the use of additive manufacturing for fabrication of micro and nano-scale components and the direction of future research. Incorporating many examples from industry, the book is ideal for professional engineers, technicians, and fabrication managers in multiple industries. Maximizes understanding of advanced manufacturing processes and their capabilities, as well as the limitations of each of these technologies; Explains use of contactless manufacturing processes in applications such as electronics and sensor fabrication; Serves as a ready reference on the latest cutting and joining technologies, including those at the micro- and nano-scale.

Comprehensive Materials Processing John Wiley & Sons

The technique of making MEMS structures are kept improving which from old fashion with high cost machine to very advanced one to save time and labor cost. In this report, laser machining of silicon using ND:YAG is introduced. The main objectives are generating MEMS structures on silicon wafer by using laser micromachining and the effects of parameters of laser micromachining on silicon.STATISTICA is used to design and analyze the experiments. Two experimental sets: (1) laser processing with assist gas and (2)laser processing without assist gas were carried out. Basic feature of MEMS and micro spots were generated. The micro features were investigated under SEM. Experimental results were analyzed in STATISTICA. Analyzed results show that laser power is the most significant effect followed by pulse width and the assist gas on the micro feature size and particularly feature quality. It was found that laser processing without assist gas produce promising results.

Micro- and Nano-manufacturing Springer Nature

This book is the first of its kind to collectively address design-based and mechanical micro-manufacturing topics in one place. It focuses on design and materials selection, as well as the manufacturing of micro-products using mechanical-based micro-manufacturing process technologies. After addressing the fundamentals and non-metallic-based micro-manufacturing processes in the semiconductor industry, it goes on to address specific metallic-based micro-manufacturing processes, such as: micro-forming, micro-machining, micro-molding, micro-laser processing, micro-layered manufacturing, micro-joining, micro-assembly and materials handling, and microEDM and ECM. The book provides an in-depth understanding of materials behavior at micro-scales and under different micro-scale processing conditions, while also including a wide variety of emerging micro-scale manufacturing issues and examples.

Modern Manufacturing Processes John Wiley & Sons

Advanced materials are becoming increasingly important as substitutes for traditional materials and as facilitators for new and unique products. They have had a considerable impact on the development of a wide range of strategic technologies. Structural ceramics, biomaterials, composites and intermetallics fall under this category of advanced mater

Advances in Laser Materials Processing Springer

Finish Manufacturing Processes are those final stage processing techniques which are deployed to bring a product to readiness for marketing and putting in service. Over recent decades a number of finish manufacturing processes have been newly developed by researchers and technologists. Many of these developments have been reported and illustrated in existing literature in a piecemeal manner or in relation only to specific applications. For the first time, Comprehensive Materials Finishing integrates a wide body of this knowledge and understanding into a single, comprehensive work. Containing a mixture of review articles, case studies and research findings resulting from R & D activities in industrial and academic domains, this reference work focuses on how some finish manufacturing processes are advantageous for a broad range of technologies. These include applicability, energy and technological costs as well as practicability of implementation. The work covers a wide range of materials such as ferrous, non-ferrous and polymeric materials. There are three main distinct types of finishing processes: Surface Treatment by which the properties of the material are modified without generally changing the physical dimensions of the surface; Finish Machining Processes by which a small layer of material is removed from the surface by various machining processes to render improved surface characteristics; and Surface Coating Processes by which the surface properties are improved by adding fine layer(s) of materials with superior surface characteristics. Each of these primary finishing processes is presented in its own volume for ease of use, making Comprehensive Materials Finishing an essential reference source for researchers and professionals at all career stages in academia and industry. Provides an interdisciplinary focus, allowing readers to become familiar with the broad range of uses for materials finishing Brings together all known research in materials finishing in a single reference for the first time Includes case studies that illustrate theory and show how it is applied in practice

5th International and 26th All India Manufacturing Technology, Design and Research Conference, AIMTDR 2014 Springer Science & Business Media

Discover the state-of-the-art in multiscale modeling and optimization in manufacturing from two leading voices in the field Modeling and Optimization in Manufacturing delivers a comprehensive approach to various manufacturing processes and shows readers how multiscale modeling and optimization processes help improve upon them. The book elaborates on the foundations and applications of computational modeling and optimization processes, as well as recent developments in the field. It offers discussions of manufacturing processes, including forming, machining, casting, joining, coating, and additive manufacturing, and how computer simulations have influenced their development. Examples for each category of manufacturing are provided in the text, and industrial applications are described for the reader. The distinguished authors also provide an insightful perspective on likely future trends and developments in manufacturing modeling and optimization, including the use of large materials databases and machine learning. Readers

will also benefit from the inclusion of: A thorough introduction to the origins of manufacturing, the history of traditional and advanced manufacturing, and recent progress in manufacturing An exploration of advanced manufacturing and the environmental impact and significance of manufacturing Practical discussions of the economic importance of advanced manufacturing An examination of the sustainability of advanced manufacturing, and developing and future trends in manufacturing Perfect for materials scientists, mechanical engineers, and process engineers, Modeling and Optimization in Manufacturing will also earn a place in the libraries of engineering scientists in industries seeking a one-stop reference on multiscale modeling and optimization in manufacturing.

30 October 2002, Brugge, Belgium CRC Press

Microfabrication and precision engineering is an increasingly important area relating to metallic, polymers, ceramics, composites, biomaterials and complex materials. Micro-electro-mechanical-systems (MEMS) emphasize miniaturization in both electronic and mechanical components. Microsystem products may be classified by application, and have been applied to a variety of fields, including medical, automotive, aerospace and alternative energy. Microsystems technology refers to the products as well as the fabrication technologies used in production. With detailed information on modelling of micro and nano-scale cutting, as well as innovative machining strategies involved in microelectrochemical applications, microchannel fabrication, as well as underwater pulsed Laser beam cutting, among other techniques, Microfabrication and Precision Engineering is a valuable reference for students, researchers and professionals in the microfabrication and precision engineering fields. Contains contributions by top industry experts Includes the latest techniques and strategies Special emphasis given to state-of-the art research and development in microfabrication and precision engineering

Laser Machining of Advanced Materials Society of Manufacturing Engineers

Advances in Laser Materials Processing: Technology, Research and Application, Second Edition, provides a revised, updated and expanded overview of the area, covering fundamental theory, technology and methods, traditional and emerging applications and potential future directions. The book begins with an overview of the technology and challenges to applying the technology in manufacturing. Parts Two thru Seven focus on essential techniques and process, including cutting, welding, annealing, hardening and peening, surface treatments, coating and materials deposition. The final part of the book considers the mathematical modeling and control of laser processes. Throughout, chapters review the scientific theory underpinning applications, offer full appraisals of the processes described and review potential future trends. A comprehensive practitioner guide and reference work explaining state-of-the-art laser processing technologies in manufacturing and other disciplines Explores challenges, potential, and future directions through the continuous development of new, application-specific lasers in materials processing Provides revised, expanded and updated coverage

Uv Nanosecond-pulsed Laser Micro-machining of Polymers and Selective Laser Melting of Powder Metals BoD – Books on Demand

Traditional machining has many limitations in today’s technology-driven world, which has caused industrial professionals to begin implementing various optimization techniques within their machining processes. The application of methods including machine learning and genetic algorithms has recently transformed the manufacturing industry and created countless opportunities in non-traditional machining methods. Significant research in this area, however, is still considerably lacking. Machine Learning Applications in Non-Conventional Machining Processes is a collection of innovative research on the advancement of intelligent technology in industrial environments and its applications within the manufacturing field. While highlighting topics including evolutionary algorithms, micro-machining, and artificial neural networks, this book is ideally designed for researchers, academicians, engineers, managers, developers, practitioners, industrialists, and students seeking current research on intelligence-based machining processes in today’s technology-driven market.

Design and Fabrication of Subwavelength Annular Aperture and Its Application to Laser Machining CRC Press

This issue contains 25 invited and contributed papers, all peer reviewed according to the American Ceramic Society Review Process. The latest developments in processing and manufacturing technologies are covered, including green manufacturing, smart processing, advanced composite manufacturing, rapid processing, joining, machining, and net shape forming technologies. These papers discuss the most important aspects necessary for understanding and further development of processing and manufacturing of ceramic materials and systems.

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