Silver Sintering For Power Electronics Meptec Org

Modeling, Analysis, Design, and Tests for Electronics Packaging beyond Moore
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Resilient Hybrid Electronics for Extreme/Harsh Environments
Disruptive Wide Bandgap Semiconductors, Related Technologies, and Their Applications
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2021 22nd International Conference on Thermal, Mechanical and Multi Physics Simulation and Experiments in Microelectronics and Microsystems (EuroSimE)
Sintering Applications
Nanopackaging
Power Electronics Semiconductor Devices
Fiber Electronics
Green and Sustainable Manufacturing of Advanced Material
Harsh Environment Electronics
Semiconductor Nanocrystals and Metal Nanoparticles
Silver Micro-Nanoparticles
Principles of Soldering
Advances in Nanotechnology Research and Application: 2012 Edition
Sintering of Advanced Materials

Modern Ceramic Engineering
Spark-Plasma Sintering and Related Field-Assisted Powder Consolidation Technologies

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ARIANA LESTER

Modeling, Analysis, Design, and Tests for Electronics Packaging beyond Moore CRC Press
Circuit designers, packaging engineers, printed board fabricators, and procurement personnel will find this book's microelectronic package design-for-reliability guidelines and approaches essential for achieving their life-cycle, cost-effectiveness, and on-time delivery goals. Its uniquely organized, time-phased approach to design, development, qualification, manufacture, and in-service management shows you step-by-step how to: * Define realistic system requirements in terms of mission profile, operating life, performance expectations, size, weight, and cost * Define the system usage environment so that all operating, shipping, and storage conditions, including electrical, thermal, radiation, and mechanical loads, are assessed using realistic data * Identify potential failure modes, sites, mechanisms, and architecture-stress interactions--PLUS appropriate measures you can take to reduce, eliminate, or accommodate expected failures * Characterize materials and processes by the key controllable factors, such as types and levels of defects, variations in material properties and dimensions, and the manufacturing and assembly processes involved * Use experiment, step-stress, and accelerated methods to ensure optimum design before production begins Detailed design guidelines for substrate...wire and wire, tape automated, and flip-chip bonding...element attachment and case, lead, lead and lid seals--incorporating dimensional and geometric configurations of package elements, manufacturing and assembly conditions, materials selection, and loading conditions--round out this guide's comprehensive coverage. Detailed guidelines for substrate...wire and wire, tape automated, and flip-chip bonding...element attachment and case, lead, lead and lid seals--incorporating dimensional and geometric configurations of package elements, manufacturing and assembly conditions, materials selection, and loading conditions--round out this guide's comprehensive coverage. of related interest... PHYSICAL ARCHITECTURE OF VLSI SYSTEMS --Allan D. Kraus, Robert Hannemann and Michael Pecht For the professional engineer involved in the design and manufacture of products containing electronic components, here is a comprehensive handbook to the theory and methods surrounding the assembly of microelectronic and electronic components. The book focuses on computers and consumer electronic products with internal subsystems that reflect mechanical design constraints, cost limitations, and aesthetic and ergonomic concerns. Taking a total system approach to packaging, the book systematically examines: basic chip and computer architecture; design and layout; interassembly and interconnections; cooling scheme; materials selection, including ceramics, glasses, and metals; stress, vibration, and acoustics; and manufacturing and assembly technology. 1994 (0-471-53299-1) pp. SOLDERING PROCESSES AND EQUIPMENT --Michael G. Pecht This comprehensive, fundamentals first handbook outlines the soldering methods and techniques used in the manufacture of microelectronic chips and electronic circuit boards. In a clear, easy-to-access format, the book discusses: soldering processes and classification; the material dynamics of heat soldering when assembling differing materials; wave and reflow soldering; controlling contamination during manufacturing cleanings; techniques for assuring reliability and quality control during manufacturing; rework, repair, and manual assembly; the modern assembly / repair station; and more. The book also provides clear guidelines on assembly techniques as well as an appendix of various solder equipment manufacturers. 1993 (0-471-59167-X) 312 pp.

Lead-free Soldering Process Development and Reliability John Wiley & Sons
Electromagnetic field-assisted sintering techniques have increasingly attracted attention of scientists and technologists. Spark-plasma sintering (SPS) and other field-assisted powder consolidation approaches provide remarkable capabilities to the processing of materials into configurations previously unattainable. Of particular significance is the possibility of using very fast heating rates, which, coupled with the field-assisted mass transport, stand behind the purported ability to achieve high densities during consolidation and to maintain the nanostructure of consolidated materials via these techniques. Potentially, SPS and related technologies have many significant advantages over the conventional powder processing methods, including the lower process temperature, the shorter holding time, dramatically improved properties of sintered products, low manufacturing costs, and environmental friendliness.

Resilient Hybrid Electronics for Extreme/Harsh Environments Springer
Covering the major topics in lead-free soldering Lead-free Soldering Process Development and Reliability provides a comprehensive discussion of all modern topics in lead-free soldering. Perfect for process, quality, failure analysis and reliability engineers in production industries, this reference will help practitioners address issues in research, development and production. Among other topics, the book addresses: · Developments in process engineering (SMT, Wave, Rework, Paste Technology) · Low temperature, high temperature and high reliability alloys · Intermetallic compounds · PCB surface finishes and laminates · Underfills, encapsulants and conformal coatings · Reliability assessments In a regulatory environment that includes the adoption of mandatory lead-free requirements in a variety of countries, the book's explanations of high-temperature, low-temperature, and high-reliability lead-free alloys in terms of process and reliability implications are invaluable to working engineers. Lead-free Soldering takes a forward-looking approach, with an eye towards developments likely to impact the industry in the coming years. These will include the introduction of lead-free requirements in high-reliability electronics products in the medical, automotive, and defense industries. The book provides practitioners in these and other segments of the industry with guidelines and information to help comply with these requirements.

Disruptive Wide Bandgap Semiconductors, Related Technologies, and Their Applications Springer Nature
A wealth of practical design information ... the next-best-thing to having a mentor with a quarter-century of experience!

Components, Packaging and Manufacturing Technology

BoD – Books on Demand
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.

Thermal Analysis of Power Electronic Devices Used in Renewable Energy Systems John Wiley & Sons
This book reports on cutting-edge design methods and tools in industrial engineering, advanced findings in mechanics and material science, and relevant technological applications. Topics span from geometric modelling tools to applications of virtual/augmented reality, from interactive design to ergonomics, human factors research and reverse engineering. Further topics include integrated design and optimization methods, as well as experimental validation techniques for product, processes and systems development, such as additive manufacturing technologies. This book is based on the International Conference on Design Tools and Methods in Industrial Engineering, ADM 2019, held on September 9–10, 2019, in Modena, Italy, and organized by the Italian Association of Design Methods and Tools for Industrial Engineering, and the Department of Engineering "Enzo Ferrari" of the University of Modena and Reggio Emilia, Italy. It provides academics and professionals with a timely overview and extensive information on trends and technologies in industrial design and manufacturing.

Power Electronics Basics Elsevier
Semiconductor nanocrystals and metal nanoparticles are the building blocks of the next generation of electronic, optoelectronic, and photonic devices. Covering this rapidly developing and interdisciplinary field, the book examines in detail the physical properties and device applications of semiconductor nanocrystals and metal nanoparticles. It begins with a review of the synthesis and characterization of various semiconductor nanocrystals and metal nanoparticles and goes on to discuss in detail their optical, light emission, and electrical properties. It then illustrates some exciting applications of nanoelectronic devices (memristors and single-electron devices) and optoelectronic devices (UV detectors, quantum dot lasers, and solar cells), as well as other applications (gas sensors and metallic nanopastes for power electronics packaging). Focuses on a new class of materials that exhibit fascinating physical properties and have many exciting device applications. Presents an overview of synthesis strategies and characterization techniques for various semiconductor nanocrystal and metal nanoparticles. Examines in detail the optical/optoelectronic properties, light emission properties, and electrical properties of semiconductor nanocrystals and metal nanoparticles. Reviews applications in nanoelectronic devices, optoelectronic devices, and photonic devices.

Power Electronics Design MDPI
Power Electronic Packaging presents an in-depth overview of power electronic packaging design, assembly,reliability and modeling. Since there is a drastic difference between IC fabrication and power electronic packaging, the book systematically introduces typical power electronic packaging design, assembly, reliability and failure analysis and material selection so readers can clearly understand each task's unique characteristics. Power electronic packaging is one of the fastest growing segments in the power electronic industry, due to the rapid growth of power integrated circuit (IC) fabrication, especially for applications like portable, consumer, home, computing and automotive electronics. This book also covers how advances in both semiconductor content and power advanced package design have helped cause advances in power device capability in recent years. The author extrapolates the most recent trends in the book's areas of focus to highlight where further improvement in materials and techniques can drive continued advancements, particularly in thermal management, usability, efficiency, reliability and overall cost of power semiconductor solutions.

Power Electronic Packaging BoD – Books on Demand
Innovations in Nanoscience and Nanotechnology summarizes the state of the art in nano-sized materials. The authors focus on innovation aspects and highlight potentials for future developments and applications in health care, including pharmaceutics, dentistry, and cosmetics; information and communications; energy; and chemical engineering. The chapters are written by leading researchers in nanoscience, chemistry, pharmacy, biology, chemistry, physics, engineering, medicine, and social science. The authors come from a range of backgrounds including academia, industry, and national and international laboratories around the world. This book is ideally suited for researchers and students in chemistry, physics, biology, engineering, materials science, and medicine and is a useful guide for industrialists. It aims to provide inspiration for scientists, new ideas for developers and innovators in industry, and guidelines for toxicologists. It also provides guidelines for agencies and government authorities to establish safe working conditions.

Mathematics Applied to Engineering John Wiley & Sons
This book presents a comprehensive overview of nanoscale electronics and systems packaging, and covers nanoscale structures, nanoelectronics packaging, nanowire applications in packaging, and offers a roadmap for future trends. Composite materials are studied for high-k dielectrics, resistors and inductors, electrically conductive adhesives, conductive "inks," underfill fillers, and solder enhancement. The book is intended for industrial and academic researchers, industrial electronics packaging engineers who need to keep abreast of progress in their field, and others with interests in nanotechnology. It surveys the application of nanotechnologies to electronics packaging, as represented by current research across the field.

Advances in Manufacturing Engineering ASM International
The success of future innovative technology relies upon a community with a shared vision. Here, we present an overview of the latest technological progress in the field of printed electronics for use in harsh or extreme environments. Each chapter unlocksscientific and engineering discoveries that will undoubtedly lead to progression from proof of concept to device creation. The main topics covered in this book include some of the most promising materials, methods, and the ability to integrate printed materials with commercial components to provide the basis for the next generation of electronics that are dubbed "survivable" in environments with high g-orces, corrosion,

vibration, and large temperature fluctuations. A wide variety of materials are discussed that contribute to robust hybrid electronics, including printable conductive composite inks, ceramics and ceramic matrix composites, polymer-erived ceramics, thin metal films, elastomers, solders and epoxies, to name a few. Collectively, these materials and associated components are used to construct conductive traces, interconnects, antennas, pressure sensors, temperature sensors, power inducting devices, strain sensors and gauges, soft actuators, supercapacitors, piezo ionic elements, resistors, waveguides, filters, electrodes, batteries, various detectors, monitoring devices, transducers, and RF systems and graded dielectric, or graded index (GRIN) structures. New designs that incorporate the electronics as embedded materials into channels, slots and other methods to protect the electronics from the extreme elements of the operational environment are also envisioned to increase their survivability while remaining cognizant of the required frequency of replacement, reapplication and integration of power sources. Lastly, the ability of printer manufacturers, software providers and users to work together to build multi-axis, multi-material and commercial-off-the-shelf (COTS) integration into user-friendly systems will be a great advancement for the field of printed electronics. Therefore, the blueprint for manufacturing resilient hybrid electronics consists of novel designs that exploit the benefits of advances in additive manufacturing that are then efficiently paired with commercially available components to produce devices that exceed known constraints. As a primary example, metals can be deposited onto polymers in a variety of ways, including aerosol jetting, microdispensing, electroplating, sintering, vacuum deposition, supersonic beam cluster deposition, and plasma-based techniques, to name a few. Taking these scientific discoveries and creatively combining them into robotic, multi-material factories of the future could be one shared aim of the printed electronics community toward survivable device creation.

Wide Bandgap Semiconductors for Power Electronics CRC Press

Power Electronics Basics: Operating Principles, Design, Formulas, and Applications provides fundamental knowledge for the analysis and design of modern power electronic devices. This concise and user-friendly resource:Explains the basic concepts and most important terms of power electronicsDescribes the power assemblies, control, and passive compon

Design Tools and Methods in Industrial Engineering John Wiley & Sons

This book is an original and timeless description of the elasticity of solids, and more particularly of crystals, covering all aspects from theory and elastic constants to experimental moduli. The first part is dedicated to a phenomenological and dimensionless representation of macroscopic crystal elasticity, which allows us to compare all crystals of the same symmetry with the concept of anisotropy and to establish new relations between elastic constants. Multi-scale approaches are then put forward to describe the elasticity at an atomic scale or for polycrystals. The relationship between elasticity and structural or physical properties is illustrated by many experimental data. The second part is entirely devoted to a Lagrangian theory of vibrations and its application to the characterization of elasticity by means of the dynamic resonant method. This unique approach applied to tensioncompression, flexural and torsional tests allows for an accurate determination of elastic moduli of structural and functional crystals, varying from bulk to multi-coated materials

Electrical Contacts John Wiley & Sons

The first book to paint a complete picture of the challenges of processing functional nanomaterials for printed electronics devices, and additive manufacturing fabrication processes. Following an introduction to printed electronics, the book focuses on various functional nanomaterials available, including conducting, semi-conducting, dielectric, polymeric, ceramic and tailored nanomaterials. Subsequent sections cover the preparation and characterization of such materials along with their formulation and preparation as inkjet inks, as well as a selection of applications. These include printed interconnects, passive and active modules, as well as such high-tech devices as solar cells, transparent electrodes, displays, touch screens, sensors, RFID tags and 3D objects. The book concludes with a look at the future for printed nanomaterials. For all those working in the field of printed electronics, from entrants to specialized researchers, in a number of disciplines ranging from chemistry and materials science to engineering and manufacturing, in both academia and industry.

2018 7th Electronic System-Integration Technology Conference (ESTC) John Wiley & Sons

This book analyzes the thermal characteristics of power electronic devices (PEDs) with a focus on those used in wind and solar energy systems. The authors focus on the devices used in such applications, for example boost converters and inverters under different operating conditions. The book explains in detail finite element modeling techniques, setting up measuring systems, data analysis, and PEDs' lifetime calculations. It is appropriate reading for graduate students and researchers who focus on the design and reliability of power electronic devices.

Nanoscience and Nanotechnology BoD – Books on Demand

Sintering is a method for manufacturing components from ceramic or metal powders by heating the powder until the particles adhere to form the component required. The resulting products are characterised by an enhanced density and strength, and are used in a wide range of industries. Sintering of advanced materials: fundamentals and processes reviews important developments in this technology and its applicationsPart one discusses the fundamentals of sintering with chapters on topics such as the thermodynamics of sintering, kinetics and mechanisms of densification, the kinetics of microstructural change and liquid phase sintering. Part two reviews advanced sintering processes including atmospheric sintering, vacuum sintering, microwave sintering, field/current assisted sintering and photonic sintering. Finally, Part three covers sintering of aluminium, titanium and their alloys, refractory metals, ultrahard materials, thin films, ultrafine and nanosized particles for advanced materials.With its distinguished editor and international team of contributors, Sintering of advanced materials: fundamentals and processes reviews the latest advances in sintering and is a standard reference for researchers and engineers involved in the processing of ceramics, powder metallurgy, net-shape manufacturing and those using advanced materials in such sectors as electronics, automotive and aerospace engineering. Explores the thermodynamics of sintering including sinter bonding and densification Chapters review a variety of sintering methods including atmosphere, vacuum, liquid phase and microwave sintering Discusses sintering of a variety of materials featuring refractory metals, super hard materials and functionally graded materials

Harsh Environment Electronics Springer

Covering the choice, attachment, and testing of contact materials, Electrical Contacts introduces a thorough discussion on making electric contact and contact interface conduction, presents a general outline of, and measurement techniques for, important corrosion mechanisms, discusses the results of contact wear when plug-in connections are made and broken, investigates the effect of thin noble metal plating on electronic connections, relates crucial considerations for making high- and low-power contact joints, details arcing effects on contacts including contact erosion, welding, and contamination, and contains nearly 2800 references, tables, equations, drawings, and photographs.

Nanomaterials for 2D and 3D Printing Springer Science & Business Media

Provides in-depth knowledge on novel materials that make electronics work under high-temperature and high-pressure conditions This book reviews the state of the art in research and development of lead-free interconnect materials for electronic packaging technology. It identifies the technical barriers to the development and manufacture of high-temperature interconnect materials to investigate into the complexities introduced by harsh conditions. It teaches the techniques adopted and the possible alternatives of interconnect materials to cope with the impacts of extreme temperatures for implementing at industrial scale. The book also examines the application of nanomaterials, current trends within the topic area, and the potential environmental impacts of material usage. Written by world-renowned experts from academia and industry, Harsh Environment Electronics: Interconnect Materials and Performance Assessment covers interconnect materials based on silver, gold, and zinc alloys as well as advanced approaches utilizing polymers and nanomaterials in the first section. The second part is devoted to the performance assessment of the different interconnect materials and their respective environmental impact. -Takes a scientific approach to analyzing and addressing the issues related to interconnect materials involved in high temperature electronics -Reviews all relevant materials used in interconnect technology as well as alternative approaches otherwise neglected in other literature -Highlights emergent research and theoretical concepts in the implementation of different materials in soldering and die-attach applications -Covers wide-bandgap semiconductor device technologies for high temperature and harsh environment applications, transient liquid phase bonding, glass frit based die attach solution for harsh environment, and more -A pivotal reference for professionals, engineers, students, and researchers Harsh Environment Electronics: Interconnect Materials and Performance Assessment is aimed at materials scientists, electrical engineers, and semiconductor physicists, and treats this specialized topic with breadth and depth.

Die-Attach Materials for High Temperature Applications in Microelectronics Packaging Springer

Thermoelectric Energy Conversion: Theories and Mechanisms, Materials, Devices, and Applications provides readers with foundational knowledge on key aspects of thermoelectric conversion and reviews future prospects. Sections cover the basic theories and mechanisms of thermoelectric physics, the chemical and physical aspects of classical to brand-new materials, measurement techniques of thermoelectric conversion properties from the materials to modules and current research, including the physics, crystallography and chemistry aspects of processing to produce thermoelectric devices. Finally, the book discusses thermoelectric conversion applications, including cooling, generation, energy harvesting, space, sensor and other emerging areas of applications. Reviews key applications of thermoelectric energy conversion, including cooling, power generation, energy harvesting, and applications for space and sensing Discusses a wide range of materials, including skutterudites, heusler materials, chalcogenides, oxides, low dimensional materials, and organic materials Provides the fundamentals of thermoelectric energy conversion, including the physics, phonon conduction, electronic correlation, magneto-seebeck theories, topological insulators and thermionics

Integrated Circuit, Hybrid, and Multichip Module Package Design Guidelines Springer

This book is a printed edition of the Special Issue "Interface Circuits for Microsensor Integrated Systems" that was published in Micromachines