Ultra Clean Processing Of Semiconductor Surfaces 8

#ultra clean processing #semiconductor surfaces #wafer cleaning #contamination control #microelectronics fabrication

Explore the critical importance and advanced methodologies of ultra clean processing for semiconductor surfaces. This essential guide delves into state-of-the-art wafer cleaning techniques, crucial for eliminating microscopic contaminants and ensuring the highest performance and reliability in microelectronic device fabrication. Understand how meticulous surface preparation directly impacts yield and functionality in cutting-edge semiconductor manufacturing.

Ultra Clean Processing of Semiconductor Surfaces VIII

Volume is indexed by Thomson Reuters CPCI-S (WoS). This collection of 86 peer-reviewed papers covers all aspects of the use of ultra-clean technology for large-scale integration on semiconductors, and cleaning and contamination-control in both front-end-of-line (FEOL) and back-end-of-line (BEOL) processing.

Ultra Clean Processing of Semiconductor Surfaces XV

Selected peer-reviewed full text papers from the 15th International Symposium on Ultra Clean Processing of Semiconductor Surfaces (UCPSS) Selected, peer-reviewed papers from the 15-th International Symposium on Ultra Clean Processing of Semiconductor Surfaces (UCPSS), April 12-15, 2021, Mechelen, Belgium

Ultra Clean Processing of Semiconductor Surfaces XIV

The 14th International Symposium on Ultra Clean Processing of Semiconductor Surfaces (14th UCPSS 2018, Leuven, Belgium, September 3-5, 2018) was organized by IMEC and the scope of this symposium includes all issues related to contamination, cleaning and surface preparation in mainstream large-scale Integrated Circuit manufacturing. This collection will be interesting and useful for experts in the field of microelectronics. Microelectronics, Semiconductors, Surface Cleaning, Surface Functionalization, Particle Removal, Etching, Wetting Drying, Pattern Collapse, Interconnects, Contamination Materials Science.

Ultra Clean Processing of Semiconductor Surfaces IX

Volume is indexed by Thomson Reuters CPCI-S (WoS). The contents of this publication include every conceivable issue related to contamination, cleaning and surface preparation during mainstream large-scale integrated circuit manufacture. Typically, silicon is used as the main semiconductor substrate. However, other semiconducting materials such as SiGe and SiC are currently being used in the source-sink junction areas, and materials such as Ge and III-V compounds are being considered for the transistor channel region of future-generation devices.

Ultra Clean Processing of Semiconductor Surfaces XIII

This volume contains the proceedings of 13th International Symposium on Ultra Clean Processing of Semiconductor Surfaces (UCPSS 2016, Knokke, Belgium, September 12-14, 2016) (www.ucpss.org) and includes studies on cleaning such as particle removal using acoustic enhancement, removal of metallic contamination, pattern collapse of fine flexible and fragile features, wetting and drying issues, control and measuring of contamination . FEOL and BEOL topics cover: chemistry of semiconductor surfaces, cleaning related to new gate stacks, cleaning at the interconnect level, selective wet etching, resist strip and polymer removal, cleaning and contamination control for various new materials and cleaning after Chemical-Mechanical-Polishing (CMP).

Ultra Clean Processing of Semiconductor Surfaces X

Selected, peer reviewed papers from the 10th International Symposium on Ultra Clean Processing of Semiconductor Surfaces (UCPSS), September 20-22, 2010, Ostend, Belgium

Ultra Clean Processing of Semiconductor Surfaces XII

Collection of selected, peer reviewed papers from the 12th International Symposium on Ultra Clean Processing of Semiconductor Surfaces (UCPSS), September 21-24, 2014, Brussels, Belgium. The 71 papers are grouped as follows: Chapter 1: Cleaning for FEOL Applications,Chapter 2: Cleaning for FEOL Applications: Beyond-Si Active Area, Chapter 3: Wet Etching for FEOL Applications,Chapter 4: Wet Processing of High Aspect Ratio Structures, Chapter 5: Fluid Dynamics, Cleaning Mechanics,Chapter 6: Photo Resist Performance and Rework, Chapter 7: Cleaning for BEOL Interconnect Applications, Chapter 8: Cleaning for 3D Applications, Chapter 9: Contamination Control and AMC,Chapter 10: Cleaning and Wet Etching for Semiconductor Photo-Voltaic Cells

Ultra Clean Processing of Silicon Surfaces ...

This issue covers topics related to the removal of contaminants from and conditioning of Si (SOI), SiC, Ge, SiGe, and III-V semiconductor surfaces; cleaning media, including non-aqueous cleaning methods and tools; front- and back-end cleaning operations; integrated cleaning; cleaning of MEMS; photomasks (reticles); porous low-k dielectrics; post-CMP cleaning; wafer bevel cleaning and polishing; characterization, evaluation, and monitoring of cleaning; correlation with device performance as well as cleaning of equipment and storage and handling hardware. The hardcover edition includes a bonus CD-ROM of Cleaning Technology in Semiconductor Device Manufacturing 1989?2007: Proceedings from the ECS Semiconductor Cleaning Symposia 1?10. This bonus material is not available with the PDF edition.

Cleaning and Surface Conditioning Technology in Semiconductor Device Manufacturing 10

This volume documents the proceedings of the 8th International Symposium on Particles on Surfaces: Detection, Adhesion and Removal held in Providence, Rhode Island, June 24a26, 2002. The study of particles on surfaces is extremely crucial in a host of diverse technological areas, ranging from microelectronics to optics to biomedical. In a world o

Particles on Surfaces: Detection, Adhesion and Removal

An authoritative, systematic, and comprehensive description of current CMP technology Chemical Mechanical Planarization (CMP) provides the greatest degree of planarization of any known technique. The current standard for integrated circuit (IC) planarization, CMP is playing an increasingly important role in other related applications such as microelectromechanical systems (MEMS) and computer hard drive manufacturing. This reference focuses on the chemical aspects of the technology and includes contributions from the foremost experts on specific applications. After a detailed overview of the fundamentals and basic science of CMP, Microelectronic Applications of Chemical Mechanical

Planarization: * Provides in-depth coverage of a wide range of state-of-the-art technologies and applications * Presents information on new designs, capabilities, and emerging technologies, including topics like CMP with nanomaterials and 3D chips * Discusses different types of CMP tools, pads for IC CMP, modeling, and the applicability of tribometrology to various aspects of CMP * Covers nanotopography, CMP performance and defect profiles, CMP waste treatment, and the chemistry and colloidal properties of the slurries used in CMP * Provides a perspective on the opportunities and challenges of the next fifteen years Complete with case studies, this is a valuable, hands-on resource for professionals, including process engineers, equipment engineers, formulation chemists, IC manufacturers, and others. With systematic organization and questions at the end of each chapter to facilitate learning, it is an ideal introduction to CMP and an excellent text for students in advanced graduate courses that cover CMP or related semiconductor manufacturing processes.

Cleaning Technology in Semiconductor Device Manufacturing VIII

A totally new concept for clean surface processing of Si wafers is introduced in this book. Some fifty distinguished researchers and engineers from the leading Japanese semiconductor companies, such as NEC, Hitachi, Toshiba, Sony and Panasonic as well as from several universities reveal to us for the first time the secrets of these highly productive institutions. They describe the techniques and equipment necessary for the preparation of clean high-quality semiconductor surfaces as a first step in high-yield/high-quality device production. This book thus opens the door to the manufacturing of reliable nanoscale devices and will be extremely useful for every engineer, physicist and technician involved in the production of silicon semiconductor devices.

Microelectronic Applications of Chemical Mechanical Planarization

The second International SiGe & Ge: Materials, Processing, and Devices Symposium was part of the 2006 ECS conference held in Cancun, Mexico from October 29-Nov 3, 2006. This meeting provided a forum for reviewing and discussing all materials and device related aspects of SiGe & Ge. The hardcover edition includes a bonus CD-ROM containing the PDF of the entire issue.

Ultraclean Surface Processing of Silicon Wafers

Retaining the comprehensive and in-depth approach that cemented the bestselling first edition's place as a standard reference in the field, the Handbook of Semiconductor Manufacturing Technology, Second Edition features new and updated material that keeps it at the vanguard of today's most dynamic and rapidly growing field. Iconic experts Robert Doering and Yoshio Nishi have again assembled a team of the world's leading specialists in every area of semiconductor manufacturing to provide the most reliable, authoritative, and industry-leading information available. Stay Current with the Latest Technologies In addition to updates to nearly every existing chapter, this edition features five entirely new contributions on... Silicon-on-insulator (SOI) materials and devices Supercritical CO2 in semiconductor cleaning Low-ºdielectrics Atomic-layer deposition Damascene copper electroplating Effects of terrestrial radiation on integrated circuits (ICs) Reflecting rapid progress in many areas, several chapters were heavily revised and updated, and in some cases, rewritten to reflect rapid advances in such areas as interconnect technologies, gate dielectrics, photomask fabrication, IC packaging, and 300 mm wafer fabrication. While no book can be up-to-the-minute with the advances in the semiconductor field, the Handbook of Semiconductor Manufacturing Technology keeps the most important data, methods, tools, and techniques close at hand.

SiGe and Ge

This symposium was the sCientific-technical event of the centennial celebration of the Asea Brown Boveri Switzerland. The purpose was to assess the present state of the art as well as shaping the basis for future progress in the area of power devices and related power circuits. The merger of Brown Boveri (BBC) with Asea to Asea Brown Boveri (ABB) three years ago gave new stimulus and enriched the technical substance of the symposium. By 1991, 100 years after the formation of BBC in Switzerland as a single company, this organization has been decentralized, forming 35 independent ABB companies. One of them - ABB Semiconductors Ltd. - directly deals with the power semiconductor business. These significant changes reflect the changes in the market place: increased competition and higher customer expectations have to be fulfilled. In line with the core business activities of ABB and with the concept of sustainable development, it is natural for ABB to be active in the area of power devices and circuits. Increased awareness towards energy conservation is one of the main drives for these activities. User

friendliness is another drive: integration of intelligent functions, e.g. protection and/or increased direct computer interfacing of the power circuits. Therefore, also the R&D activities related to the subject of thIs symposium will in the future be characterized by an even stronger coupling with the market needs. For the members of the R&D Laboratories this means improved customer partnership beyond operational excellence.

Handbook of Semiconductor Manufacturing Technology

Recognizing the need for improved control measures in the manufacturing process of highly sensitized semiconductor technology, this practical reference provides in-depth and advanced treatment on the origins, procedures, and disposal of a variety of contaminants. It uses contemporary examples based on the latest hardware and processing apparatus to illustrate previously unavailable results and insights along with experimental and theoretical developments. Ensures the proper methods necessary to meet the standards established in the 1997 National Technology Roadmap for Semiconductors (NTRS)! Summarizing up-to-date control practices in the industry, Contamination-Free Manufacturing for Semiconductors and Other Precision Products: Details the physics and chemistry behind the mechanisms leading to contamination-induced failures Considers particles and molecular contaminants, including the entire spectrum of mass-based contaminants Outlines primary contamination problems and target control levels Reveals and offers solutions to inadequate areas of measurement capability and control technology Clarifies significant problems and decisions facing the industry by analyzing NTRS standards and contamination mechanisms Containing over 700 literature references, drawings, photographs, equations, and tables, Contamination-Free Manufacturing for Semiconductors and Other Precision Products is an essential reference for electrical and electronics, instrumentation, process, manufacturing, development, contamination control and quality engineers; physicists; and upper-level undergraduate and graduate students in these disciplines.

Power Semiconductor Devices and Circuits

Volume is indexed by Thomson Reuters CPCI-S (WoS). This book is sub-divided into 10 different topical sections; each dealing with important issues in surface cleaning and preparation.

Contamination-Free Manufacturing for Semiconductors and Other Precision Products

."... ALTECH 2003 was Symposium J1 held at the 203rd Meeting of the Electrochemical Society in Paris, France from April 27 to May 2, 2003 ... Symposium M1, Diagnostic Techniques for Semiconductor Materials and Devices, was part of the 202nd Meeting of the Electrochemical Society held in Salt Lake City, Utah, from October 21 to 25, 2002 ..."--p. iii.

Ultra Clean Processing of Silicon Surfaces VII

Rajiv Kohli and Kash Mittal have brought together the work of experts from different industry sectors and backgrounds to provide a state-of-the-art survey and best practice guidance for scientists and engineers engaged in surface cleaning or handling the consequences of surface contamination. Topics covered include: A systems analysis approach to contamination control Physical factors that influence the behavior of particle deposition in enclosures An overview of current yield models and description of advanced models Types of strippable coatings, their properties and applications of these coatings for removal of surface contaminants In-depth coverage of ultrasonic cleaning Contamination and cleaning issues at the nanoscale Experimental results illustrating the impact of model parameters on the removal of particle contamination The expert contributions in this book provide a valuable source of information on the current status and recent developments in surface contamination and cleaning. The book will be of value to industry, government and academic personnel involved in research and development, manufacturing, process and quality control, and procurement specifications across sectors including microelectronics, aerospace, optics, xerography and joining (adhesive bonding). ABOUT THE EDITORS Rajiv Kohli is a leading expert with The Aerospace Corporation in contaminant particle behavior, surface cleaning, and contamination control. At the NASA Johnson Space Center in Houston, Texas, he provides technical support for contamination control related to ground-based and manned spaceflight hardware for the Space Shuttle, the International Space Station, and the new Constellation Program that is designed to meet the United States Vision for Space Exploration. Kashmiri Lal "Kash" Mittal was associated with IBM from 1972 to 1994. Currently, he is teaching and consulting in the areas of surface contamination and cleaning, and in adhesion science and technology. He is the Editor-in-Chief of the Journal of Adhesion Science and Technology and is the editor of

98 published books, many of them dealing with surface contamination and cleaning. Also available Developments in Surface Contamination and Cleaning, Volume 1: Fundamentals and Applied Aspects (edited by Rajiv Kohli & K.L. Mittal). ISBN: 9780815515555. · Provides guidance on best-practice cleaning techniques and the avoidance of surface contamination · Covers contamination and cleaning issues at the nanoscale · Includes an in-depth look at ultrasonic cleaning

Analytical and Diagnostic Techniques for Semiconductor Materials, Devices, and Processes

A unique and well-organized reference, this book provides illuminating data, distinctive insight and expert guidance on silicon properties.

Developments in Surface Contamination and Cleaning - Vol 2

As science pushes closer toward the atomic size scale, new challenges arise to slow the pace of the miniaturization that has transformed our society and fueled the information age. New technologies are necessary to surpass these obstacles and realize the tremendous growth predicted by Moore's law. Assembled from the works of pioneering researchers, Scientific Wet Process Technology for Innovative LSI/FPD Manufacturing presents new developments and technologies for producing the next generation of electronic circuits and displays. This book introduces radical-reaction-based semiconductor manufacturing technologies that overcome the limitations of the existing molecule-reaction-based technologies. It systematically details the procedures and underlying concepts involved in wet process technologies and applications. Following an introduction to semiconductor surface chemical electronics, expert contributors discuss the principles and technology of high-performance wet cleaning; etching technologies and processes; antistatic technology; wet vapor resist stripping technology; and process and safety technologies including waste reclamation, chemical composition control, and ultrapure water and liquid chemical supply systems and materials for fluctuation-free facilities. Currently, large production runs are needed to balance the costs of acquiring and tuning equipment for specialized operating conditions. Scientific Wet Process Technology for Innovative LSI/FPD Manufacturing explains the technologies and processes used to meet the demand for variety and low volumes that exists in today's digital electronics marketplace.

Properties of Crystalline Silicon

Wafer cleaning, microcontamination and surface passivation are the key focus of this proceedings volume, the 3rd in a successful series from MRS. It is a field in which control of surface chemistry and surface morphology, as well as particle and molecular contamination removal, are of critical importance. This volume expands the scope of the topic to include ultraclean technology in a broader sense, emphasizing the identification and characterization of trace contamination, strategies for removal, and equipment considerations, as well as critical limits for impact on devices. Novel processes, such as chemical mechanical polishing (CMP), and their ramifications for contamination removal are also addressed.

Cleaning Technology in Semiconductor Device Manufacturing

The second Edition of the Handbook of Silicon Wafer Cleaning Technology is intended to provide knowledge of wet, plasma, and other surface conditioning techniques used to manufacture integrated circuits. The integration of the clean processes into the device manufacturing flow will be presented with respect to other manufacturing steps such as thermal, implant, etching, and photolithography processes. The Handbook discusses both wet and plasma-based cleaning technologies that are used for removing contamination, particles, residue, and photoresist from wafer surfaces. Both the process and the equipment are covered. A review of the current cleaning technologies is included. Also, advanced cleaning technologies that are under investigation for next generation processing are covered; including supercritical fluid, laser, and cryoaerosol cleaning techniques. Additionally theoretical aspects of the cleaning technologies and how these processes affect the wafer is discussed such as device damage and surface roughening will be discussed. The analysis of the wafers surface is outlined. A discussion of the new materials and the changes required for the surface conditioning process used for manufacturing is also included. Focused on silicon wafer cleaning techniques including wet, plasma, and other surface conditioning techniques used to manufacture integrated circuits As this book covers the major technologies for removing contaminants, it is a reliable reference for anyone that manufactures integrated circuits, or supplies the semiconductor and microelectronics industries Covers processes and equipment, as well as new materials and changes required for the surface conditioning

process Editors are two of the top names in the field and are both extensively published Discusses next generation processing techniques including supercritical fluid, laser, and cryoaerosol

Scientific Wet Process Technology for Innovative LSI/FPD Manufacturing

This book covers a broad spectrum of the silicon-based materials and their device applications. This book provides a broad coverage of the silicon-based materials including different kinds of silicon-related materials, their processing, spectroscopic characterization, physical properties, and device applications. This two-volume set offers a selection of timely topics on silicon materials namely those that have been extensively used for applications in electronic and photonic technologies. The extensive reference provides broad coverage of silicon-based materials, including different types of silicon-related materials, their processing, spectroscopic characterization, physical properties, and device applications. Fourteen chapters review the state of the art research on silicon-based materials and their applications to devices. This reference contains a subset of articles published in AP's recently released Handbook of Advanced Electronic and Photonic Materials and Devices (2000, ISBN 012-5137451, ten volumes) by Dr. Hari Nalwa. This two-volume work strives to present a highly coherent coverage of silicon-based material uses in the vastly dynamic arena of silicon chip research and technology. Key Features * Covers silicon-based materials and devices * Include types of materials, their processing, fabrication, physical properties and device applications * Role of silicon-based materials in electronic and photonic technology * A very special topic presented in a timely manner and in a format

Ultraclean Semiconductor Processing Technology and Surface Chemical Cleaning and Passivation

This issue of ECS Transactions includes papers presented during the 11th International Symposium on Cleaning and Surface Conditioning Technology in Semiconductor Device Manufacturing held during the ECS Fall Meeting in Vienna, Austria, October 4-9, 2009.

Analytical and Diagnostic Techniques for Semiconductor Materials, Devices and Processes

Advanced semiconductor technology is depending on innovation and less on "classical" scaling. SiGe, Ge, and Related Compounds have become a key component of the arsenal in improving semiconductor performance. This issue of ECS Transactions discusses the technology to form these materials, process them, FET devices incorporating them, Surfaces and Interfaces, Optoelectronic devices, and HBT devices.

Proceedings of the Fifth International Symposium on Cleaning Technology in Semiconductor Device Manufacturing

This volume chronicles the proceedings of the 9th International Symposium on Particles on Surfaces: Detection, Adhesion and Removal held in Philadelphia, PA, June 2004. The study of particles on surfaces is crucially important in a legion of diverse technological areas, ranging from microelectronics to biomedical to space. This volume contains a total of 21 papers covering many ramifications of particles on surfaces, ranging from detection to removal. All manuscripts were rigorously peer-reviewed and revised, and properly edited before inclusion in this book. The topics covered include: imaging and analysis of macro and nanosize particles and surface features; determination of particles on surfaces; laser inactivation on surfaces; laser-assisted nanofabrication on surfaces; post-CMP cleaning process; pre-gate cleaning; solar panel obscuration in the Martian atmosphere; adhesion and friction of microsized particles; microroughness of textile fibers and capture of particles; factors affecting particle adhesion and removal; various techniques for cleaning or removal of particles from different substrates including laser, combination of laser-induced shockwave and explosive vaporization of liquid, attenuated total internal reflection of laser light, CO2 snow, use of dense phase fluids, use of surfactants and impinging air jet; and removal of sub-100-nm particles.

Handbook of Silicon Wafer Cleaning Technology, 2nd Edition

This volume chronicles the proceedings of the 9th International Symposium on Particles on Surfaces: Detection, Adhesion and Removal held in Philadelphia, PA, June 2004. The study of particles on surfaces is crucially important in a legion of diverse technological areas, ranging from microelectronics to biomedical to space. This volume contains a total of 21 papers covering many ramifications of particles on surfaces, ranging from detection to removal. All manuscripts were rigorously peer-reviewed and revised, and properly edited before inclusion in this book. The topics covered include: imaging

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Crystalline Defects and Contamination

The proceedings of ALTECH 2009 address recent developments and applications of analytical techniques for semiconductor materials, processes and devices. The papers comprise techniques of elemental and structural analysis for bulk and surface impurities and defects, thin films as well as dopants in ultra-shallow junctions.

Silicon-Based Material and Devices, Two-Volume Set

Official Gazette of the United States Patent and Trademark Office