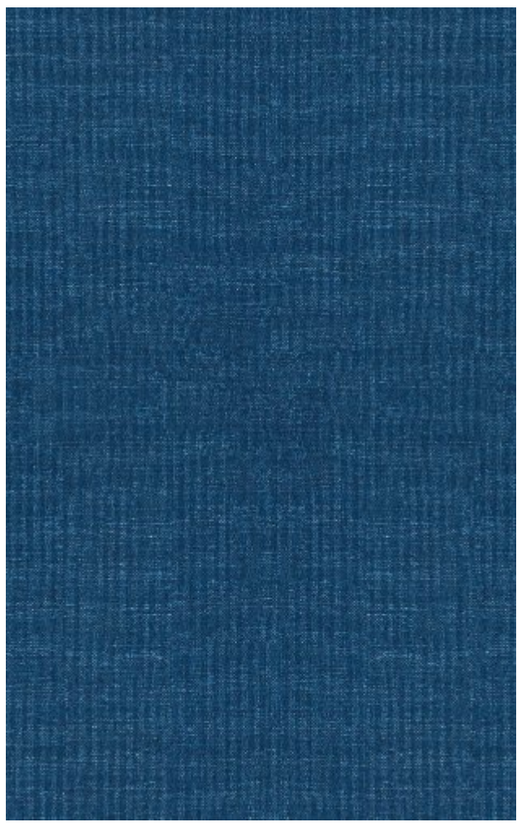

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Plasma Etching-Dennis M. Manos 1989 Plasma etching plays an essential role in microelectronic circuit manufacturing. Suitable for researchers, process engineers, and graduate students, this book introduces the basic physics and chemistry of electrical discharges and relates them to plasma etching mechanisms. Throughout the volume the authors offer practical examples of process chemistry, equipment design, and production methods.

Plasma Etching Processes for Interconnect Realization in VLSI-Nicolas Posseme 2015-04-14 This is the first of two books presenting the challenges and future prospects of plasma etching processes for microelectronics, reviewing the past, present and future issues of etching processes in order to improve the understanding of these issues through innovative solutions. This book focuses on back end of line (BEOL) for high performance device realization and presents an overview of all etch challenges for interconnect realization as well as the current etch solutions proposed in the semiconductor industry. The choice of copper/low-k interconnect architecture is one of the keys for integrated circuit performance, process manufacturability and scalability. Today, implementation of porous low-k material is mandatory in order to minimize signal propagation delay in interconnections. In this context, the traditional plasma process issues (plasma-induced damage, dimension and profile control, selectivity) and new emerging challenges (residue formation, dielectric wiggling) are critical points of research in order to control the reliability and reduce defects in interconnects. These issues and potential solutions are illustrated by the authors through different process architectures available in the semiconductor industry (metallic or organic hard mask strategies). Presents the difficulties encountered for interconnect realization in very large-scale integrated (VLSI) circuits Focused on plasma-dielectric surface interaction Helps you further reduce the dielectric constant for the future technological nodes

Plasma Etching-M. Sugawara 1998-05-28 The focus of this book is the remarkable advances in understanding of low pressure RF (radio frequency) glow discharges. A basic analytical theory and plasma physics are explained. Plasma diagnostics are also covered before the practicalities of etcher use are explored.

Plasma Deposition, Treatment, and Etching of Polymers-Riccardo d'Agostino 2012-12-02 Plasma Deposition, Treatment, and Etching of Polymers takes a broad look at the basic principles, the chemical processes, and the diagnostic procedures in the interaction of plasmas with polymer surfaces. This recent technology has yielded a large class of new materials offering many applications, including their use as coatings for chemical fibers and films. Additional applications include uses for the passivation of metals, the surface hardening of tools, increased biocompatibility of biomedical materials, chemical and physical sensors, and a variety of micro- and optoelectronic devices. Appeals to a broad range of industries from microelectronics to space technology Discusses a wide array of new uses for plasma polymers Provides a tutorial introduction to the field Surveys various classes of plasma polymers, their chemical and morphological properties, effects of plasma process parameters on the growth and structure of these synthetic materials, and techniques for characterization Interests scientists, engineers, and students alike

Introduction to Plasma Physics and Controlled Fusion-Francis F. Chen 2013-03-09 TO THE SECOND EDITION In the nine years since this book was first written, rapid progress has been made scientifically in nuclear fusion, space physics, and nonlinear plasma theory. At the same time, the energy shortage on the one hand and the exploration of Jupiter and Saturn on the other have increased the national awareness of the important applications of plasma physics to energy production and to the understanding of our space environment. In magnetic confinement fusion, this period has seen the attainment 13 of a Lawson number nTE of 2 x 10 cm -3 sec in the Alcator tokamaks at MIT; neutral-beam heating of the PL T tokamak at Princeton to KTi = 6. 5 keV; increase of average ß to 3%-5% in tokamaks at Oak Ridge and General Atomic; and the stabilization of mirror-confined plasmas at Livermore, together with injection of ion current to near field-reversal conditions in the 2XIIß device. Invention of the tandem mirror has given magnetic confinement a new and exciting dimension. New ideas have emerged, such as the compact torus, surface-field devices, and the EßT mirror-torus hybrid, and some old ideas, such as the stellarator and the reversed-field pinch, have been revived. Radiofrequency heat ing has become a new star with its promise of dc current drive. Perhaps most importantly, great progress has been made in the understanding of the MHD behavior of toroidal plasmas: tearing modes, magnetic Vll Vlll islands, and disruptions.

Plasma Processing of Semiconductors-Paul Williams 1997-05-31 Plasma Processing of Semiconductors contains 28 contributions from 18 experts and covers plasma etching, plasma deposition, plasma-surface interactions, numerical modelling, plasma diagnostics, less conventional processing applications of plasmas, and industrial applications. Audience: Coverage ranges from introductory to state of the art, thus the book is suitable for graduate-level students seeking an introduction to the field as well as established workers wishing to broaden or update their knowledge.

Plasma Processes for Semiconductor Fabrication-W. N. G. Hitchon 2005-09-29 An up-to-date description of plasma etching and deposition in semiconductor fabrication.

Introduction to Plasma Physics-R.J Goldston 2020-07-14 Introduction to Plasma Physics is the standard text for an introductory lecture course on plasma physics. The text’s six sections lead readers systematically and comprehensively through the fundamentals of modern plasma physics. Sections on single-particle motion, plasmas as fluids, and collisional processes in plasmas lay the groundwork for a thorough understanding of the subject. The authors take care to place the material in its historical context for a rich understanding of the ideas presented. They also emphasize the importance of medical imaging in radiotherapy, providing a logical link to more advanced works in the area. The text includes problems, tables, and illustrations as well as a thorough index and a complete list of references.

Principles of Plasma Discharges and Materials Processing-Michael A. Lieberman 2005-04-08 A Thorough Update of the Industry Classic on Principles of PlasmaProcessing The first edition of Principles of Plasma Discharges and MaterialsProcessing, published over a decade ago, was lauded for itscomplete treatment of both basic plasma physics and industrialplasma processing, quickly becoming the primary reference forstudents and professionals. The Second Edition has been carefully updated and revised toreflect recent developments in the field and to further clarify thepresentation of basic principles. Along with in-depth coverage ofthe fundamentals of plasma physics and chemistry, the authors applybasic theory to plasma discharges, including calculations of plasmaparameters and the scaling of plasma parameters with controlparameters. New and expanded topics include: * Updated cross sections * Diffusion and diffusion solutions * Generalized Bohm criteria * Expanded treatment of dc sheaths * Langmuir probes in time-varying fields * Electronegative discharges * Pulsed power discharges * Dual frequency discharges * High-density rf sheaths and ion energy distributions * Hysteresis and instabilities * Helicon discharges * Hollow cathode discharges * Ionized physical vapor deposition * Differential substrate charging With new chapters on dusty plasmas and the kinetic theory ofdischarges, graduate students and researchers in the field ofplasma processing should find this new edition more valuable thanever.

Lecture Notes on Principles of Plasma Processing-Francis F. Chen 2012-12-06 Plasma processing of semiconductors is an interdisciplinary field requiring knowledge of both plasma physics and chemical engineering. The two authors are experts in each of these fields, and their collaboration results in the merging of these fields with a common terminology. Basic plasma concepts are introduced painlessly to those who have studied undergraduate electromagnetics but have had no previous exposure to plasmas. Unnecessarily detailed derivations are omitted; yet the reader is led to understand in some depth those concepts, such as the structure of sheaths, that are important in the design and operation of plasma processing reactors. Physicists not accustomed to low-temperature plasmas are introduced to chemical kinetics, surface science, and molecular spectroscopy. The material has been condensed to suit a nine-week graduate course, but it is sufficient to bring the reader up to date on current problems such as copper interconnects, low-k and high-k dielectrics, and oxide damage. Students will appreciate the web-style layout with ample color illustrations opposite the text, with ample room for notes. This short book is ideal for new workers in the semiconductor industry who want to be brought up to speed with minimum effort. It is also suitable for Chemical Engineering students studying plasma processing of materials; Engineers, physicists, and technicians entering the semiconductor industry who want a quick overview of the use of plasmas in the industry.

Semiconductor Manufacturing Handbook-Hwaiyu Geng 2005-04-27 This handbook will provide engineers with the principles, applications, and solutions needed to design and manage semiconductor manufacturing operations. Consolidating the many complex fields of semiconductor fundamentals and manufacturing into one volume by deploying a team of world class specialists, it allows the quick look up of specific manufacturing reference data across many subdisciplines.

Industrial Plasma Engineering-J Reece Roth 1995-01-01 This book will provide the necessary theoretical background and a description of plasma-related devices and processes that are used industrially for physicists and engineers. It is a self-contained introduction to the principles of plasma engineering with comprehensive references. This volume also includes the terminology, jargon and acronyms used in the field of industrial plasma engineering - indexed when they first appear in the text - along with their definitions and a discussion of their meaning. It is aimed at assisting the student in learning key terminology and concepts, and providing the in-service engineer or scientist with a technical glossary. An extensive index and appendices enhance the value of this book as a key reference source. These incorporate a list of the nomenclature used in mathematical expressions in the text, physical constants, and often-used plasma formulae. SI units are used throughout. Intended for students from all engineering and physical science disciplines, and as a reference source by in-service engineers. Coverage: * basic information on plasma physics and the physical processes important in industrial plasmas * sources of ion and electron beams and ionizing radiation used in industrial applications * physics and technology of DC and RF electrical discharges.

Nonthermal Plasma Chemistry and Physics-Jurgen Meichsner 2012-11-13 In addition to introducing the basics of plasma physics, Nonthermal Plasma Chemistry and Physics is a comprehensive presentation of recent developments in the rapidly growing field of nonthermal plasma chemistry. The book offers a detailed discussion of the fundamentals of plasma chemical reactions and modeling, nonthermal plasma sources, relevant diagnostic techniques, and selected applications. Elucidating interconnections and trends, the book focuses on basic principles and illustrations across a broad field of applications. Expert contributors address environmental aspects of plasma chemistry. The book also includes selected plasma conditions and specific applications in volume plasma chemistry and treatment of material surfaces such as plasma etching in microelectronics, chemical modification of polymer surfaces and deposition of functional thin films. Designed for students of plasma physics, Nonthermal Plasma Chemistry and Physics is a concise resource also for specialists in this and related fields of research.

Plasma Processing for VLSI-Norman G. Einspruch 2014-12-01 VLSI Electronics: Microstructure Science, Volume 8: Plasma Processing for VLSI (Very Large Scale Integration) discusses the utilization of plasmas for general semiconductor processing. It also includes expositions on advanced deposition of materials for metallization, lithographic methods that use plasmas as exposure sources and for multiple resist patterning, and device structures made possible by anisotropic etching. This volume is divided into four sections. It begins with the history of plasma processing, a discussion of some of the early developments and trends for VLSI. The second section, Deposition, discusses deposition techniques for VLSI such as sputtering metals for metallization and contacts, plasma-enhanced chemical vapor deposition of metals and suicides, and plasma enhanced chemical vapor deposition of dielectrics. The part on Lithography presents the high-resolution trilayer resist system, pulsed x-ray sources for submicrometer x-ray lithography, and high-intensity deep-UV sources. The last part, Etching, provides methods in etching, like ion-beam etching using reactive gases, low-pressure reactive ion etching, and the uses of inert-gas ion milling. The theory and mechanisms of plasma etching are described and a number of new device structures made possible by anisotropic etching are enumerated as well. Scientists, engineers, researchers, device designers, and systems architects will find the book useful.

Plasma Processing-R. G. Frieser 1981

Handbook of Advanced Plasma Processing Techniques-R.J. Shul 2011-06-28 Pattern transfer by dry etching and plasma-enhanced chemical vapor de position are two of the cornerstone techniques for modern integrated cir cuit fabrication. The success of these methods has also sparked interest in their application to other techniques, such as surface-micromachined sen sors, read/write heads for data storage and magnetic random access memory (MRAM). The extremely complex chemistry and physics of plasmas and their interactions with the exposed surfaces of semiconductors and other materi als is often overlooked at the manufacturing stage. In this case, the process is optimized by an informed "trial-and-error" approach which relies heavily on design-of-experiment techniques and the intuition of the process engineer. The need for regular cleaning of plasma reactors to remove built-up reaction or precursor gas products adds an extra degree of complexity because the interaction of the reactive species in the plasma with the reactor walls can also have a strong effect on the number of these species available for etching or deposition. Since the microelectronics industry depends on having high process yields at each step of the fabrication process, it is imperative that a full understanding of plasma etching and deposition techniques be achieved.

Dry Etching for VLSI-A.J. van Roosmalen 2013-06-29 This book has been written as part of a series of scientific books being published by Plenum Press. The scope of the series is to review a chosen topic in each volume. To supplement this information, the abstracts to the most important references cited in the text are reprinted, thus allowing the reader to find in-depth material without having to refer to many additional publications. This volume is dedicated to the field of dry (plasma) etching, as applied in silicon semiconductor processing. Although a number of books have appeared dealing with this area of physics and chemistry, these all deal with parts of the field. This book is unique in that it gives a compact, yet complete, in-depth overview of fundamentals, systems, processes, tools, and applications of etching with gas plasmas for VLSI. Examples are given throughout the fundamental sections, in order to give the reader a better insight in the meaning and magnitude of the many parameters relevant to dry etching. Electrical engineering concepts are emphasized to explain the pros and cons of reactor concepts and excitation frequency ranges. In the description of practical applications, extensive use is made of cross-referencing between processes and materials, as well as theory and practice. It is thus intended to provide a total model for understanding dry etching. The book has been written such that no previous knowledge of the subject is required. It is intended as a review of all aspects of dry etching for silicon semiconductor processing.

Plasma Processing XII-G. S. Mathad 1998

Plasma Physics-Alexander Piel 2017-09-07 The enlarged new edition of this textbook provides a comprehensive introduction to the basic processes in plasmas and demonstrates that the same fundamental concepts describe cold gas-discharge plasmas, space plasmas, and hot fusion plasmas. Starting from particle drifts in magnetic fields, the principles of magnetic confinement fusion are explained and compared with laser fusion. Collective processes are discussed in terms of plasma waves and instabilities. The concepts of plasma description by magnetohydrodynamics, kinetic theory, and particle simulation are stepwise introduced. Space charge effects in sheath regions, double layers and plasma diodes are given the necessary attention. The novel fundamental mechanisms of dusty plasmas are explored and integrated into the framework of conventional plasmas. The book

concludes with a concise description of modern plasma discharges. Written by an internationally renowned researcher in experimental plasma physics, the text keeps the mathematical apparatus simple and emphasizes the underlying concepts. The guidelines of plasma physics are illustrated by a host of practical examples, preferentially from plasma diagnostics. There, Langmuir probe methods, laser interferometry, ionospheric sounding, Faraday rotation, and diagnostics of dusty plasmas are discussed. Though primarily addressing students in plasma physics, the book is easily accessible for researchers in neighboring disciplines, such as space science, astrophysics, material science, applied physics, and electrical engineering. This second edition has been thoroughly revised and contains substantially enlarged chapters on plasma diagnostics, dusty plasmas and plasma discharges. Probe techniques have been rearranged into basic theory and a host of practical examples for probe techniques in dc, rf, and space plasmas. New topics in dusty plasmas, such as plasma crystals, Yukawa balls, phase transitions and attractive forces have been adopted. The chapter on plasma discharges now contains a new section on conventional and high-power impulse magnetron sputtering. The recently discovered electrical asymmetry effect in capacitive rf-discharges is described. The text is based on an introductory course to plasma physics and advanced courses in plasma diagnostics, dusty plasmas, and plasma waves, which the author has taught at Kiel University for three decades. The pedagogical approach combines detailed explanations, a large number of illustrative figures, short summaries of the basics at the end of each chapter, and a selection of problems with detailed solutions.

Physics of Radio-Frequency Plasmas-Pascal Chabert 2011-02-24 Low-temperature radio frequency plasmas are essential in various sectors of advanced technology, from micro-engineering to spacecraft propulsion systems and efficient sources of light. The subject lies at the complex interfaces between physics, chemistry and engineering. Focusing mostly on physics, this book will interest graduate students and researchers in applied physics and electrical engineering. The book incorporates a cutting-edge perspective on RF plasmas. It also covers basic plasma physics including transport in bounded plasmas and electrical diagnostics. Its pedagogic style engages readers, helping them to develop physical arguments and mathematical analyses. Worked examples apply the theories covered to realistic scenarios, and over 100 in-text questions let readers put their newly acquired knowledge to use and gain confidence in applying physics to real laboratory situations.

High Density Plasma Sources-Oleg A. Popov 1995 This book describes the design, physics, and performance of high density plasma sources which have been extensively explored in low pressure plasma processing, such as plasma etching and planarization, plasma enhanced chemical vapor deposition of thin films, sputtered deposition of metals and dielectrics, epitaxial growth of silicon and GaAs, and many other applications. This is a comprehensive survey and a detailed description of most advanced high density plasma sources used in plasma processing.

Plasma Electronics-Toshiaki Makabe 2006-03-27 Without plasma processing techniques, recent advances in microelectronics fabrication would not have been possible. But beyond simply enabling new capabilities, plasma-based techniques hold the potential to enhance and improve many processes and applications. They are viable over a wide range of size and time scales, and can be used for deposition,

Plasma Etching Processes for Sub-quarter Micron Devices-G. S. Mathad 2000

Dry Etching Technology for Semiconductors-Kazuo Nojiri 2014-10-25 This book is a must-have reference to dry etching technology for semiconductors, which will enable engineers to develop new etching processes for further miniaturization and integration of semiconductor integrated circuits. The author describes the device manufacturing flow, and explains in which part of the flow dry etching is actually used. The content is designed as a practical guide for engineers working at chip makers, equipment suppliers and materials suppliers, and university students studying plasma, focusing on the topics they need most, such as detailed etching processes for each material (Si, SiO2, Metal etc) used in semiconductor devices, etching equipment used in manufacturing fabs, explanation of why a particular plasma source and gas chemistry are used for the etching of each material, and how to develop etching processes. The latest, key technologies are also described, such as 3D IC Etching, Dual Damascene Etching, Low-k Etching, Hi-k/Metal Gate Etching, FinFET Etching, Double Patterning etc.

Ion Bombardment Energy Control for Fluorocarbon Plasma Etching of Organosilicate Glass-Rardchawadee Silapunt 2004

Glow Discharge Processes-Brian Chapman 1980 Develops detailed understanding of the deposition and etching of materials by sputtering discharge, and of etching of materials by chemically active discharge. Treats glow discharge at several levels from basic phenomena to industrial applications--practical techniques diligently related to fundamentals. Subjects range from voltage, distributions encountered in plasma etching systems to plasma-electron interactions that contribute to sustaining the discharge.

GaN and Related Materials-Stephen J. Pearton 1997-10-29 Presents views on current developments in heat and mass transfer research related to the modern development of heat exchangers. Devotes special attention to the different modes of heat and mass transfer mechanisms in relation to the new development of heat exchangers design. Dedicates particular attention to the future needs and demands for further development in heat and mass transfer. GaN and related materials are attracting tremendous interest for their applications to high-density optical data storage, blue/green diode lasers and LEDs, high-temperature electronics for high-power microwave applications, electronics for aerospace and automobiles, and stable passivation films for semiconductors. In addition, there is great scientific interest in the nitrides, because they appear to form the first semiconductor system in which extended defects do not severely affect the optical properties of devices. This series provides a forum for the latest research in this rapidly-changing field, offering readers a basic understanding of new developments in recent research. Series volumes feature a balance between original theoretical and experimental research in basic physics, device physics, novel materials and quantum structures, processing, and systems.

An Introduction to the Atomic and Radiation Physics of Plasmas-G. J. Tallents 2018-02-22 Plasmas comprise more than 99% of the observable universe. They are important in many technologies and are key potential sources for fusion power. Atomic and radiation physics is critical for the diagnosis, observation and simulation of astrophysical and laboratory plasmas, and plasma physicists working in a range of areas from astrophysics, magnetic fusion, and inertial fusion utilise atomic and radiation physics to interpret measurements. This text develops the physics of emission, absorption and interaction of light in astrophysics and in laboratory plasmas from first principles using the physics of various fields of study including quantum mechanics, electricity and magnetism, and statistical physics. Linking undergraduate level atomic and radiation physics with the advanced material required for postgraduate study and research, this text adopts a highly pedagogical approach and includes numerous exercises within each chapter for students to reinforce their understanding of the key concepts.

Encyclopedia of Plasma Technology - Two Volume Set-J. Leon Shohet 2016-12-12 Technical plasmas have a wide range of industrial applications. The Encyclopedia of Plasma Technology covers all aspects of plasma technology from the fundamentals to a range of applications across a large number of industries and disciplines. Topics covered include nanotechnology, solar cell technology, biomedical and clinical applications, electronic materials, sustainability, and clean technologies. The book bridges materials science, industrial chemistry, physics, and engineering, making it a must have for researchers in industry and academia, as well as those working on application-oriented plasma technologies. Also Available Online This Taylor & Francis encyclopedia is also available through online subscription, offering a variety of extra benefits for researchers, students, and librarians, including: Citation tracking and alerts Active reference linking Saved searches and marked lists HTML and PDF format options Contact Taylor and Francis for more information or to inquire about subscription options and print/online combination packages. US: (Tel) 1.888.318.2367; (E-mail) e-reference@taylorandfrancis.com International: (Tel) +44 (0) 20 7017 6062; (E-mail) online.sales@tandf.co.uk

Physics of Collisional Plasmas-Michel Moisan 2012-06-20 This text is an introduction to the physics of collisional plasmas, as opposed to plasmas in space. It is intended for graduate students in physics and engineering . The first chapter introduces with progressively increasing detail, the fundamental concepts of plasma physic. The motion of individual charged particles in various configurations of electric and magnetic fields is detailed in the second chapter while the third chapter considers the collective motion of the plasma particles described according to a hydrodynamic model. The fourth chapter is most original in that it introduces a general approach to energy balance, valid for all types of discharges comprising direct current(DC) and high frequency (HF) discharges, including an applied static magnetic field. The basic concepts required in this fourth chapter have been progressively introduced in the previous chapters. The text is enriched with approx. 100 figures, and alphabetical index and 45 fully resolved problems. Mathematical and physical appendices provide complementary information or allow to go deeper in a given subject.

Electron Beam Neutralization of Large Aspect Ratio Features During Plasma Etching-Anthony K. Quick 1998

Advanced Plasma Technology-Riccardo d'Agostino 2008-09-08 A panel of internationally renowned scientists discuss the latest results in plasma technology. This volume has been compiled with both a didactic approach and an overview of the newest achievements for industrial applications. It is divided into two main sections. One is focused on fundamental technology, including plasma production and control, high-pressure discharges, modeling and simulation, diagnostics, dust control, and etching. The section on application technology covers polymer treatments, silicon solar cell, coating and spray, biomaterials, sterilization and waste treatment, plasma propulsion, plasma display panels, and anti-corrosion coatings. The result is an indispensable work for physicists, chemists and engineers involved in the field of plasma technology.

Feature Profile Evolution in Plasma Processing Using On-wafer Monitoring System-Seiji Samukawa 2014-01-28 This book provides for the first time a good understanding of the etching profile technologies that do not disturb the plasma. Three types of sensors are introduced: on-wafer UV sensors, on-wafer charge-up sensors and on-wafer sheath-shape sensors in the plasma processing and prediction system of real etching profiles based on monitoring data. Readers are made familiar with these sensors, which can measure real plasma process surface conditions such as defect generations due to UV-irradiation, ion flight direction due to charge-up voltage in high-aspect ratio structures and ion sheath conditions at the plasma/surface interface. The plasma etching profile realistically predicted by a computer simulation based on output data from these sensors is described.

Plasma Charging Damage-Kin P. Cheung 2012-12-06 In the 50 years since the invention of transistor, silicon integrated circuit (IC) technology has made astonishing advances. A key factor that makes these advances possible is the ability to have precise control on material properties and physical dimensions. The introduction of plasma processing in pattern transfer and in thin film deposition is a critical enabling advance among other things. In state of the art silicon Ie manufacturing process, plasma is used in more than 20 different critical steps. Plasma is sometimes called the fourth state of matter (other than gas, liquid and solid). It is a mixture of ions (positive and negative), electrons and neutrals in a quasi-neutral gaseous steady state very far from equilibrium, sustained by an energy source that balances the loss of charged particles. It is a very harsh environment for the delicate ICs. Highly energetic particles such as ions, electrons and photons bombard the surface of the wafer continuously. These bombardments can cause all kinds of damage to the silicon devices that make up the integrated circuits.

Plasma Technology-M. Capitelli 2012-12-06 The present book contains the proceedings of the workshop "Plasma Technology and Applications" which was held at 11 Ciocco (Lucca-Italy) during 5-6 July 1991. The workshop was organized just before ICPIG XX to emphasize the role of plasma physics and plasma chemistry in different fields of technology. Topics cover different applications such as lamps, plasma treatment of materials (etching, deposition, nitriding), plasma sources (microwave excitation, negative ion sources) and plasma destruction of pollutants. Several chapters deal with basic concepts in plasma physics, non equilibrium plasma modeling and plasma diagnostics as well as with laser interaction with solid targets. The authors gratefully acknowledge the financial support provided by university of Bari (Italy) and by CNR (Centro di Studio per la Chimica dei Plasmi, Istituto di Fisica Atomica e Molecolare (IFAM) and Progetto Finalizzato Materiali Speciali per Tecnologie Avanzate) as well as the sponsorship of ENEA. M. Capitelli C. Gorse v CONTENTS Plasmas in nature, laboratory and technology 1 A.M. Ignatov and A.A. Rukhadze Laser diagnostics of plasmas 11 L. Pyatnitsky Probe diagnostics of plasmas 27 G. Dilecce Theory, properties and applications of non equilibrium plasmas created by external energy sources 45 E. Son Non-Equilibrium plasma modeling 59 M. Capitel1i, R. Celiberto, G. Capriati, C. Gorse and S. Longo Gas discharge lamps 81 M. Koedam Plasma etching processes and diagnostics 93 R. d'Agostino and F. Fracassi Plasma deposition: processes and diagnostics 109 A.

Industrial Plasma Technology-Yoshinobu Kawai 2010-04-26 Clearly structured in five major sections on applications, this monograph covers such hot technologies as nanotechnology, solar cell technology, biomedical and clinical applications, and sustainability. Since the topic, applications and readers are highly interdisciplinary, the book bridges materials science, industrial chemistry, physics, and engineering - making it a must-have for researchers in industry and academia, as well as those working in application-oriented plasma technology. FROM THE CONTENTS: Environmental Technologies - Thermal and Non-Thermal Plasma for Environmental Applications - Atmospheric Plasma Air Pollution Control, Water and Waste Treatment Technology - Chemistry of Organic Polluctants in Atmospheric Plasmas - and more Applications in Life Science and Medicine - Pharmaceutical Engineering by Plasma Techniques - Applications of Pulsed Power and Plasmas to Biosystems and Living Organisms - Plasma Sterilization at low pressure and Antibacterial Effect of Short-Pulse Discharge - Plasma-Enhanced Synnthesis of Nanoparticles for Biomedical Applications - and more Solar Cells - Plasma Processing for Thin Film Silicon Solar Cells - Characteristics of VHF Plasma with Large Area - Diagnostics and Modeling of SiH 4/H2 Plasmas for the Deposition of Microcrystalline Silicon - and more Diamond like Carbon Films - Applications of DLCs to Bio-Processing - DLC Thin Films Grown in Pulsed Plasmas - Plasma Processing of Nanocrystalline Semiconductive Cubic Borone Nitride Thin FIlms - and more Bascic and Novel Approaches - Novel Electromagnetic and Reactive Media from Microplasmas - Crystallized nanodusst Particle Growth in Low Pressure Cold Plasmas - Thomson Scattering Diagnostics of Discharge Plasmas - Collection and Removal of Fine Particles in Plasma Chambers - and more

Thin Oxide Damage by Plasma Processing-Hyungcheol Shin 1993

Wafer-mounted Sensor Arrays for Plasma Etch Processes-Mason Lanse Freed 2001

Plasma Processing- 1992

Low Pressure Plasmas and Microstructuring Technology-Gerhard Franz 2009-04-09 Over the last forty years, plasma supported processes have attracted ever - creasing interest, and now, all modern semiconductor devices undergo at least one plasma-involved processing step, starting from surface cleaning via coating to etching. In total, the range of the treated substrates covers some orders of magnitude: Trenches and linewidths of commercially available devices have - ready passed the boundary of 100 nm, decorative surface treatment will happen 2 in the mm range, and the upper limit is reached with surface protecting layers of windows which are coated with ?/4 layers against IR radiation. The rapid development of the semiconductor industry is inconceivable wi- outthegiantprogressintheplasmatechnology.Moore’slawisnotcarvedinto 1 stone, and not only the ITRS map is subject to change every ?ve years but also new branches develop and others mingle together. Moreover, the quality of conventional materials can be improved by plasma treatment:Cottonbecomesmorecrease-resistant,leathermoredurable,andthe shrinking of wool ?bers during the washing process can be signi?cantly reduced. To cut a long story short: More than 150 years after the discovery of the sputtering e?ect by Grove, plasma-based processes are about to spread out into new ?elds of research and application [1]—no wonder that the market for etching machines kept growing by an annual rate of 17 % up to the burst of the internet bubble, and it took only some years of recovery to continue the voyage [2].