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Principles and Prevention of Corrosion *Pearson* Comprehensive approach to scientific principles and methods that underlie the cause, detection, measurement and prevention of many metal corrosion problems engineering practices. **Electrochemistry and Corrosion Science** *Springer* The second edition of this textbook includes refined text in each chapter, new sections on corrosion of steel-reinforced concrete and on cathodic protection of steel reinforced bars embedded in concrete, and some new solved examples. The book introduces mathematical and engineering approximation schemes for describing the thermodynamics and kinetics of electrochemical systems, which are the essence of corrosion science, in addition to electrochemical corrosion, forms of corrosion and mechanisms of corrosion. This approach should capture the reader’s attention on the complexity of corrosion. Thus, the principles of electrochemistry and electrochemical cells are subsequently characterized in simple electrolytes from a thermodynamics point of view. **Corrosion Engineering Principles and Solved Problems** *Elsevier* Corrosion Engineering: Principles and Solved Problems covers corrosion engineering through an extensive theoretical description of the principles of corrosion theory, passivity and corrosion prevention strategies and design of corrosion protection systems. The book is updated with results published in papers and reviews in the last twenty years. Solved corrosion case studies, corrosion analysis and solved corrosion problems in the book are presented to help the reader to understand the corrosion fundamental principles from thermodynamics and electrochemical kinetics, the mechanism that triggers the corrosion processes at the metal interface and how to control or inhibit the corrosion rates. The book covers the multidisciplinary nature of corrosion engineering through topics from electrochemistry, thermodynamics, mechanical, bioengineering and civil engineering. Addresses the corrosion theory, passivity, material selections and designs Covers extensively

the corrosion engineering protection strategies Contains over 500 solved problems, diagrams, case studies and end of chapter problems Could be used as a text in advanced/graduate corrosion courses as well self-study reference for corrosion engineers **Magnesium Technology 2017** *Springer* The Magnesium Technology Symposium, the event on which this collection is based, is one of the largest yearly gatherings of magnesium specialists in the world. Papers represent all aspects of the field, ranging from primary production to applications to recycling. Moreover, papers explore everything from basic research findings to industrialization. Magnesium Technology 2017 covers a broad spectrum of current topics, including alloys and their properties; cast products and processing; wrought products and processing; forming, joining, and machining; corrosion and surface finishing; ecology; and structural applications. In addition, there is coverage of new and emerging applications. **Corrosion General Session** *The Electrochemical Society* **Proceedings of the Symposium on Critical Factors in Localized Corrosion II** *The Electrochemical Society* **Magnesium Technology 2019** *Springer* The Magnesium Technology Symposium, the event on which this collection is based, is one of the largest yearly gatherings of magnesium specialists in the world. Papers represent all aspects of the field, ranging from primary production to applications to recycling. Moreover, papers explore everything from basic research findings to industrialization. Magnesium Technology 2019 covers a broad spectrum of current topics, including alloys and their properties; cast products and processing; wrought products and processing; forming, joining, and machining; corrosion and surface finishing; and structural applications. In addition, there is coverage of new and emerging applications. **Hydrometallurgy Fundamentals and Applications** *John Wiley & Sons* "This book provides a college-level overview of chemical processing of metals in water-based solutions, in the field that is known as hydrometallurgy"-- **13th International Conference on Aluminum Alloys (ICAA 13) Conference Proceedings** *Springer* This is a collection of papers presented at the 13th International Conference on Aluminum Alloys (ICAA-13), the premier global conference for exchanging emerging knowledge on the structure and properties of aluminum materials. The papers are organized around the topics of the science of aluminum alloy design for a range of market applications; the accurate prediction of material properties; novel aluminum products and processes; and emerging developments in recycling and applications using both monolithic and multi-material solutions. **Electrochemical Techniques in Corrosion Science and Engineering** *CRC Press* This book describes the origin, use, and limitations of electrochemical phase diagrams, testing schemes for active, passive, and localized corrosion, the development and electrochemical characterization of passivity, and methods in process alteration, failure prediction, and materials selection. It offers useful guidelines for assessing the efficacy of corrosion inhibitors and coatings for metals and alloys, developing effective corrosion prediction models, calculating the corrosion rates of various materials, determining the resistance of alloys to pitting and crevice corrosion, and considering current and potential distribution effects on corrosion. **Environmental Degradation of Advanced and Traditional Engineering Materials** *CRC Press* One of the main, ongoing challenges for any engineering enterprise is that systems are built of materials subject to environmental degradation. Whether working with an airframe, integrated circuit, bridge, prosthetic

device, or implantable drug-delivery system, understanding the chemical stability of materials remains a key element in determining their useful life. Environmental Degradation of Advanced and Traditional Engineering Materials is a monumental work for the field, providing comprehensive coverage of the environmental impacts on the full breadth of materials used for engineering infrastructure, buildings, machines, and components. The book discusses fundamental degradation processes and presents examples of degradation under various environmental conditions. Each chapter presents the basic properties of the class of material, followed by detailed characteristics of degradation, guidelines on how to protect against corrosion, and a description of testing procedures. A complete, self-contained industrial reference guide, this valuable resource is designed for students and professionals interested in the development of deterioration-resistant technological systems constructed with metallurgical, polymeric, ceramic, and natural materials. **Ball Milled Nano-Structured Stainless Steel Powders Fabrication and Characterization** *Educreation Publishing* Chapter 1 discusses about introduction of different types of stainless steel and ball milling methods. This chapter also explains the mill fabrication, mill mechanics. Chapter 2 contains the synthesis of nano-structured duplex and ferritic stainless steel powders by dual drive planetary ball mill. Chapter 3 comprises of detail study of optimization of milling parameters such as process controlling agents, ball to powder weight ratio, milling speed and milling atmospheres on particle size, phases and morphology of stainless steel powders. Chapter 4 explains the fabrication of yttria dispersed and yttria free duplex and ferritic stainless steel by conventional and SPS methods and the detail study of effect of yttria addition, sintering temperature, sintering atmosphere and sintering methods on the morphology, phase transformation, density and hardness of duplex and ferritic stainless steel. Chapter 5 explains the non-lubricated sliding wear behaviour of nano-yttria dispersed and yttria free duplex and ferritic stainless steel fabricated by conventional and SPS techniques against a diamond indenter. Chapter 6 consists of the corrosion studies of SPS consolidated yttria dispersed and yttria free duplex and ferritic stainless steel by linear sweep voltammetry. In chapter 7, we discussed the electrochemical sensitivity applications of duplex and yttria dispersed duplex stainless steel powders in detecting biologically active compounds like folic acid. This chapter includes the optimization of electrochemical properties such as concentration of analyte, pH, scan rate and concentration of modifiers to study the electrocatalytic properties of duplex and yttria dispersed duplex stainless steel. **Durability of Concrete and Cement Composites** *Elsevier* Whilst most structures made using concrete and cement-based composites have not shown signs of premature degradation, there have been notable exceptions. In addition, there is increasing pressure for new structures to remain in serviceable condition for long periods with only minimal maintenance before being recycled. All these factors have highlighted the issues of what affects the durability of these materials in different circumstances and how material properties can be measured and improved. Durability of concrete and cement composites summarises key research on these important topics. After an introductory chapter, the book reviews the pore structure and chemistry of cement-based materials, providing the foundation for understanding the particular aspects of degradation which are discussed in the following chapters. These include dimensional stability and cracking processes,

chemical and microbiological degradation of concrete, corrosion of reinforcing and prestressing steels, deterioration associated with certain aggregates, effects of frost and problems involving fibre-reinforced and polymer-cement composites. With its distinguished international team of contributors, Durability of concrete and cement composites is a standard reference for all those concerned with improving the service life of structures using these materials. Analyses a range of materials such as reinforced steel in concrete, pre-stressed concrete and cement composites Discusses key degradation phenomena such as cracking processes and the impact of cold weather conditions A standard reference for those concerned with improving the service life of structures using concrete and cement based composites **Pits and Pores III Formation, Properties, and Significance for Advanced Materials : Proceedings of the International Symposium** *The Electrochemical Society* **Coatings for Harsh Environments** *MDPI* The operation of numerous components that are critical to safety in industries around the world relies on protective coatings. These coatings often allow process equipment to serve a purpose in environments well beyond the operational limit of the uncoated components. Durability, ease of application, repairability, reliability and long-term performance of such coatings are all key to their application. Therefore, this book, Coatings for Harsh Environments, is devoted to research and review articles on the metallic, non-metallic and composite coatings used in aggressive environments. In particular, the topics of interest include, but are not limited to: coatings for high temperature and molten salt applications; thermal spray and cold spray coatings for aggressive environments; corrosion, wear and cavitation resistant coatings; coatings for mitigating marine corrosion; coatings for chemical and petrochemical plants; thermal barrier coatings. **Surface Modification and Mechanisms Friction, Stress, and Reaction Engineering** *CRC Press* Leading readers through an extensive compilation of surface modification reactions and processes for specific tribological results, this reference compiles detailed studies on various residual stresses, reaction processes and mechanisms, heat treatment methods, plasma-based techniques, and more, for a solid understanding of surface structural chang **Physical Electrochemistry Fundamentals, Techniques, and Applications** *Wiley-VCH* This bestselling textbook on physical electrochemistry caters to the needs of advanced undergraduate and postgraduate students of chemistry, materials engineering, mechanical engineering, and chemical engineering. It is unique in covering both the more fundamental, physical aspects as well as the application-oriented practical aspects in a balanced manner. In addition it serves as a self-study text for scientists in industry and research institutions working in related fields. The book can be divided into three parts: (i) the fundamentals of electrochemistry; (ii) the most important electrochemical measurement techniques; and (iii) applications of electrochemistry in materials science and engineering, nanoscience and nanotechnology, and industry. The second edition has been thoroughly revised, extended and updated to reflect the state-of-the-art in the field, for example, electrochemical printing, batteries, fuels cells, supercapacitors, and hydrogen storage. **Metal Matrix Composites Wetting and Infiltration** *Springer* This book covers several aspects of the synthesis of composites by the pressureless infiltration technique. It describes the methods used to obtain green preforms, such as cold pressed and hot sintering, describing the heating time, load, and time required for pressing the

preforms. Additionally, wettability phenomena, which is directly related on infiltration, is extensively described. Wettability process and interfacial reactions are analyzed in many ceramic-metal systems prior to fabricate the composites. A complete description of fabrication processes for Metal Matrix Composites is included. An extensive section on structural, chemical, and mechanical characterization of composites fabricated with aluminum and magnesium alloys as matrices reinforced with titanium carbide (TiC), aluminum nitride (AlN), silicon carbide (SiC) and alumina (Al2O3) is included. Relevant techniques for joining composites, such as welding and brazing are addressed. As well as issues pertaining to the corrosion and wear of composites are discussed as well. Corrosion behavior of some composites exposed to aqueous media was analyzed. Corrosion of composites using TiC and SiC like reinforcement and Al, Ni, and some Al-Cux, Al-Mgx and Al-Cu-Li alloys like matrix is discussed extensively. The structural characterization techniques addressed include: scanning electron microscopy (SEM), X-ray diffraction (XRD), transmission electron microscopy (TEM), optical microscopy (OM), differential thermal analysis (DTA), high resolution transmission electron microscopy (HRTEM), and thermogravimetry analysis (TGA). Mechanical testing including hardness, elastic modulus, tension tests, and impact tests were used in the characterization of composites. Theoretical models for prediction of some mechanical properties are included too. **Corrosion in the Petrochemical Industry, Second Edition** *ASM International* Originally published in 1994, this second edition of Corrosion in the Petrochemical Industry collects peer-reviewed articles written by experts in the field of corrosion that were specifically chosen for this book because of their relevance to the petrochemical industry. This edition expands coverage of the different forms of corrosion, including the effects of metallurgical variables on the corrosion of several alloys. It discusses protection methods, including discussion of corrosion inhibitors and corrosion resistance of aluminum, magnesium, stainless steels, and nickels. It also includes a section devoted specifically to petroleum and petrochemical industry related issues. **Cyclodextrins Properties and Industrial Applications** *John Wiley & Sons* The comprehensive resource for understanding the structure, properties, and applications of cyclodextrins Cyclodextrins: Properties and Industrial Applications is a comprehensive resource that includes information on cyclodextrins (CDs) structure, their properties, formation of inclusion complex with various compounds as well as their applications. The authors Sahar Amiri and Sanam Amiri, noted experts in the field of cyclodextrins, cover both the basic and applied science in chemistry, biology, and physics of CDs and offers scientists and engineers an understand of cyclodextrins. Cyclodextrins are a family of cyclic oligosaccharides consisting of (α-1,4)-linked α-D-glucopyranose units. The formation of inclusion complex between CDs as host and guest molecules is based on non-covalent interaction such as hydrogen bonding or van der waals interactions and lead to the formation of supramolecular structures. These supramolecular structures can be used as macroinitiator for initiating various type of reactions. CDs are widely used in many industrial products such as pharmacy, food and flavours, chemistry, chromatography, catalysis, biotechnology, agriculture, cosmetics, hygiene, medicine, textiles, drug delivery, packing, separation processes, environment protection, fermentation, and catalysis. This important resource: Offers a basic understanding of cyclodextrins for

researchers and engineers Includes information of the basic structure of cyclodextrins and their properties Reviews how cyclodextrins can be applied in a variety of fields including medicine, chemistry, textiles, packing, and many others Shows how encapsulate corrosion inhibitors became active in corrosive electrolytes to ensure delivery of the inhibitors to corrosion sites and long-term corrosion protection Cyclodextrins offers research scientists and engineers a wealth of information about CDs with particular focus on how cyclodextrins are applied in various ways including in drug delivery, the food industry, and many other areas. **Electrochemical Science and Technology of Copper Proceedings of the International Symposium** *The Electrochemical Society* **Anticorrosive Nanomaterials Future Perspectives** *Royal Society of Chemistry* This book provides readers with an overview of the properties and applications of nanomaterials and nanocomposites as corrosion inhibitors. **Corrosion Processes Sensing, Monitoring, Data Analytics, Prevention/Protection, Diagnosis/Prognosis and Maintenance Strategies** *Springer Nature* This book discusses relevant topics in field of corrosion, from sensing strategies to modeling of control processes, corrosion prevention, detection of corrosion initiation, prediction of corrosion growth and evolution, to maintenance practices and return on investment.Written by leading international experts, it combines mathematical and scientific rigor with multiple case studies, examples, colorful images, case studies and numerous references exploring the essentials of corrosion in depth. It appeals to a wide readership, including corrosion engineers, managers, students and industrial and government staff, and can serve as a reference text for courses in materials, mechanical and aerospace engineering, as well as anyone working on corrosion processes. **Functionally Graded Materials VIII** *Trans Tech Publications Ltd* Volume is indexed by Thomson Reuters CPCI-S (WoS). Multifunctional materials are composite systems that exhibit useful responses to electrical, optical, magnetic and/or mechanical stimuli. They allow the compact and economic integration of two or more functions; which can be mechanical, biological, acoustic, thermal, electrical, magnetic, optical or sensory in nature. Functionally graded materials (FGM) are also multi-functional materials, which exhibit spatial variations in composition and/or microstructure; created with the specific purpose of controlling variations in thermal, structural or functional properties. In spite of large differences in the type and size scale of the materials considered, many common features exist, thus furnishing a rationale for grouping these materials together in one book. **Modern Aspects of Electrochemistry** *Springer Science & Business Media* This volume of Modern Aspects contains seven chapters. The major topics covered in the first six chapters of this volume include fundamentals of solid state electrochemistry; kinetics of electrochemical hydrogen entry into metals and alloys; oxidation of organics; fuel cells; electrode kinetics of trace-anion catalysis; nano structural analysis. The last chapter is a corrected version of chapter four from Volume 35. Faisal M. Al-faqeer and Howard W. Pickering begin the first chapter by going back to 1864 and Cailletet who found that some hydrogen evolved and was absorbed by iron when it was immersed in dilute sulfuric acid. The absorption of hydrogen into metals and alloys can lead to catastrophic failures of structures. They discuss the kinetics of electrochemical hydrogen entry into metals and alloys. In chapter three, Clyde L. Briant reviews the electrochemistry, corrosion and

hydrogen embrittlement of unalloyed titanium. He begins by reviewing the basic electrochemistry and general corrosion of titanium. He also discusses pitting and galvanostatic corrosion followed by a review of hydrogen embrittlement emphasizing the formation of hydrides and the effect of these on titanium's mechanical properties. Christos Comninellis and Gy6rgy F6ti discuss the oxidative electrochemical processes of organics in chapter three. They begin by defining direct and indirect electrochemical oxidation of organics. They introduce a model that allows them to distinguish between active (strong) and non-active (weak) anodes. Different classes of organic compounds are used for kinetic models of organic oxidation at active and non-active type anodes. **Engineering Materials for Biomedical Applications** *World Scientific* The success of any implant or medical device depends very much on thebiomaterial used. Synthetic materials (such as metals, polymers andcomposites) have made significant contributions to many establishedmedical devices. The aim of this book is to provide a basicunderstanding on the engineering and processing aspects ofbiomaterials used in medical applications. **Applied Engineering, Materials and Mechanics Proceedings of the 2016 International Conference on Applied Engineering, Materials and Mechanics (ICAEMM 2016)** *World Scientific* ICAEMM2016 is an annual international conference that aims to present research outcomes undertaken in applied engineering, materials and mechanics. The book is a collection of 48 selected peer-reviewed articles, organized into three main chapters — advanced materials and power energy theory and studies; management technology and construction engineering applications; and mechanical and hydrology engineering design and applications. This conference brings together scientists, scholars, engineers and students from universities, research institutes and industries all over the world to share their latest research results. The conference also fosters collaboration among organizations and researchers alike in the areas of applied mechanics and materials science. Contents:The Mechanical Properties of SS400C3 Plate by CSP Produced Under the Hot Rolled Pickled Deep Drawing (Y X Liu, Y J Meng, W X Li, X Guan and B Yang)Effect of Extrusion Deformation on Microstructure Evolution of Spray-Formed 7055 Aluminum Alloy (Y Z Xiang, J S Qiao, P J Wang and H Zhang)Innovation Design of Flexible Manipulator by TRIZ (G H Gao and H Wang)Application of TRIZ Contradiction Theory in Innovative Design of the Potted Filling Soil Mechanism (G H Gao and F Li)Institutional Analysis of the Development and Policy on Sino–US Energy on Saving and New Energy Vehicles (W J Wu and L J Zhu)Improved Performance of LiCoO2 Cathode Enabled by Electrode Sputtering Coating with Al2O3 (X Y Dai, Y T Lu, A J Zhou, L P Wang, C Fan and J Z Li)Antimicrobial Finishing of Polyester Fabrics Using Silica Nanoparticles (Weeranuch Kanjanapiboon, Supakit Achiwawanich, Potjanart Suwanruji and Jantip Setthayanond)Preparation and Characterization of Manganese Dioxide (MnO2) as a Cathode Catalyst for Direct Methanol Fuel Cells (Duangkamon Phuakkhaw, Atchana Wongchaisuwat, Siree Tangbunsuk and Pinsuda Viravathana)Numerical Simulation of the Energy Deposition in the HIPIB Irradiating Process of Ti Target (Ming Gao, Rui Hou, Yong You and Mengru Lv)Research on the Performance of the Offshore-Platform Air Filter Based on the Porous Medium Model (N Ye, T Sun, C-J Sun and Z-W Ma)Analysis of the Reasons Behind the Fracture of the 220kV Pipe Busbar Horizontal Line Clamp (Liu, Z-B Fan and M D Gao)Analysis of Hydrocarbons and Carbon Dioxide

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Problems (Zakieh Avazzadeh and Mohammad Heydari)Experimental Study on Linear Pressure Loss of Spray Hose (Y Gong, X Zhang, G Wang, X Chen, D J Liu and L Pei)MEMS Based Device for Steering Wheel Angle Experimental Measuring (Radu Drosescu and Silviu Zamfir)Mechanical Property Changes of KNO3 Salt Bath Nitrided Duplex Stainless Steel (Jamshid D Schurdjanov and I S Kim)Wastewaters Treatment and Drinking Water Purification with Complex Automated Electrolysis Unit (E Arakcheev, M Brunman, A Konyashin, V Brunman and A Petkova)Development and Application of Comprehensive Drought Evaluation Model for Irrigation District in North China (J Q Ma, Z W Zhang and R Weis) Readership: Academics, professionals, postgraduate and graduate students in materials engineering, materials science and applied mechanics. **Residual Stresses 2016 ICRS-10** *Materials Research Forum LLC* This book presents the proceedings of the International Conference on Residual Stresses 10 and is devoted to the prediction/modelling, evaluation, control, and application of residual stresses in engineering materials. New developments, on stress-measurement techniques, on modelling and prediction of residual stresses and on progress made in the fundamental understanding of the relation between the state of residual stress and the material properties, are highlighted. The proceedings offer an overview of the current understanding of the role of residual stresses in materials used in wide ranging application areas. **Electrochemistry in Mineral and Metal Processing 8 (EMMP 8)** *The Electrochemical Society* This issue of ECS Transactions contains papers on electrochemical aspects of concentrating and extracting base, precious and light metals from their ores and secondary materials, and associated energy and environmental considerations. Both fundamental and applied work is covered with emphasis on recent progress in: (1) mineral flotation, (2) hydrometallurgy, (3) electrowinning and refining, (4) environmental technologies associated with mineral and metal processing, (5) electrochemical methods for secondary metal production, and (6) recovery of metals from wastes. **Springer Handbook of Mechanical Engineering** *Springer Nature* This resource covers all areas of interest for the practicing engineer as well as for the student at various levels and educational institutions. It features the work of authors from all over the world who have contributed their expertise and support the globally working engineer in finding a solution for today‘s mechanical engineering problems. Each subject is discussed in detail and supported by numerous figures and tables. **Journal of the Indian Chemical Society Springer Handbook of Ocean Engineering** *Springer* This handbook is the definitive reference for the interdisciplinary field that is ocean engineering. It integrates the coverage of fundamental and applied material and encompasses a diverse spectrum of systems, concepts and operations in the maritime environment, as well as providing a comprehensive update on contemporary, leading-edge ocean technologies. Coverage includes an overview on the fundamentals of ocean science, ocean signals and instrumentation, coastal structures, developments in ocean energy technologies and ocean vehicles and automation. It aims at practitioners in a range of offshore industries and naval establishments as well as academic researchers and graduate students in ocean, coastal, offshore and marine engineering and naval architecture. The Springer Handbook of Ocean Engineering is organized in five parts: Part A: Fundamentals, Part B: Autonomous Ocean Vehicles, Subsystems and Control, Part C: Coastal Design, Part D:

Offshore Technologies, Part E: Energy Conversion **Microencapsulation Innovative Applications** *Walter de Gruyter GmbH & Co KG* Microencapsulation has become a promising technology for new applications in fields like drug delivery, biosensing, biomaterials, catalysis, intelligent microstructures and microsystems, as well as in the field of consumer goods. This book is written by authors from academia and industry and aims to present industrial adoption of microcapsules as an innovative solution for problems concerning environmentally-friendly production methods, health protection, and increase of citizen daily life standard and decrease of its costs. **Eco-Friendly Corrosion Inhibitors Principles, Designing and Applications** *Elsevier* Eco-Friendly Corrosion Inhibitors: Principles, Designing, and Applications wraps up new developments in corrosion inhibitors and their current applications in real-life environments such as in strong acidic pickling and petroleum-based liquids. The book covers several types of environmentally-friendly corrosion inhibitors in detail. In addition, it highlights both established research and technology on industrial scale corrosion inhibitors and their rapidly emerging aspects and future research directions. Provides fundamental basics and applied practices of corrosion prevention at industrial scale Serves as a valuable reference for scientists and engineers who are searching modern design for industrial scale corrosion inhibitors Focuses on the most advanced industrial scale corrosion inhibitors, including current challenges during manufacturing Includes up-to-date reference material such as websites of interest and information about the latest research **Stainless Steels for Design Engineers** *ASM International* The rate of growth of stainless steel has outpaced that of other metals and alloys, and by 2010 may surpass aluminum as the second most widely used metal after carbon steel. The 2007 world production of stainless steel was approximately 30,000,000 tons and has nearly doubled in the last ten years. This growth is occurring at the same time that the production of stainless steel continues to become more consolidated. One result of this is a more widespread need to understand stainless steel with fewer resources to provide that information. The concurrent technical evolution in stainless steel and increasing volatility of raw material prices has made it more important for the engineers and designers who use stainless steel to make sound technical judgments about which stainless steels to use and how to use them. **Nanostructured Thin Films and Coatings Mechanical Properties** *CRC Press* Authored by leading experts from around the world, the three-volume Handbook of Nanostructured Thin Films and Coatings gives scientific researchers and product engineers a resource as dynamic and flexible as the field itself. The first two volumes cover the latest research and application of the mechanical and functional properties of thin films and coatings, while the third volume explores the cutting-edge organic nanostructured devices used to produce clean energy. This first volume, Nanostructured Thin Films and Coatings: Mechanical Properties, concentrates on essential properties such as hardness, toughness, and adhesion. It looks at process and performance and offers a detailed analysis of theories and size effect. It also covers: Fundamentals of hard and superhard nanocomposites and heterostructures Determination of hardness and modulus of thin films Fracture toughness and interfacial adhesion strength of thin films: Indentation and scratch experiments and analysis Toughness and toughening of hard nanocomposite coatings Processing and mechanical properties of hybrid sol-gel-derived nanocomposite coatings

Use of nanomechanics to optimize coatings for cutting tools Electrolytic deposition of nanocomposite coatings: Processing, properties, and applications This book presents an industrial perspective on diamond and metal-containing amorphous carbon nanostructured coatings and transition metal nitride-based nanolayered and nanocomposite coatings. It also covers polymer films, from nanoscale synthesis to macroscale functionality. A complete resource, this handbook provides the detailed explanations that newcomers need, as well as the latest cutting-edge research and data for experts. Covering a wide range of mechanical and functional technologies, including those used in clean energy, these books also feature figures, tables, and images that will aid research and help professionals acquire and maintain a solid grasp of this burgeoning field. The Handbook of Nanostructured Thin Films and Coatings is composed of this volume and two others: Nanostructured Thin Films and Coatings: Functional Properties Organic Nanostructured Thin Film Devices and Coatings for Clean Energy **Physical Chemistry** *CRC Press* This title includes a number of Open Access chapters. Physical chemistry covers diverse topics, from biochemistry to materials properties to the development of quantum computers. Physical chemistry applies physics and math to problems that interest chemists, biologists, and engineers. Physical chemists use theoretical constructs and mathematical computations to understand chemical properties and describe the behavior of molecular and condensed matter. Their work involves manipulations of data as well as materials. Physical chemistry entails extensive work with sophisticated instrumentation and equipment as well as state-of-the-art computers. This new volume presents a selection of articles on topics in the field. **Microelectronic Applications of Chemical Mechanical Planarization** *John Wiley & Sons* 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. **Multi-Functional Materials and Structures IV** *Trans Tech Publications Ltd* Volume is indexed by

Thomson Reuters CPCI-S (WoS). The main focuses collection of 184 peer reviewed papers was to cover all aspects of materials, including advanced and functional materials, composites and applications, green and biomaterials, smart and intelligent materials and structures, processing and engineering of materials, natural and synthetic fiber composites and materials for specific applications. The papers are grouped as follows: I. Advanced Composites and their Applications; II. Bio-materials and Biomimetic Materials; III. Intelligent Processing of Materials and Structures; IV. Nano-Materials, -Sensors and Actuators; V. Engineering and Structural Materials; VI. Smart Materials and Structures; VII. Tribology (Surface Engineering); VIII. Materials for Fuel Cells and Solar Cells; IX. Natural Fiber Composites; X. Synthetic Fiber Composites; XI. Construction and Building Materials; XII. Soft Materials; XIII. Functional Materials; XIV. Materials Processing, Modeling and Technology; XV. Green Materials; XVI. Others. **Corrosion Engineering and Cathodic Protection Handbook With Extensive Question and Answer Section** *John Wiley & Sons* The Corrosion Engineering and Cathodic Protection Handbook combines the author's previous three works, Corrosion Chemistry, Cathodic Protection, and Corrosion Engineering to offer, in one place, the most comprehensive and thorough work available to the engineer or student. The author has also added a tremendous and exhaustive list of questions and answers based on the text, which can be used in university courses or industry courses, something that has never been offered before in this format. The Corrosion Engineering and Cathodic Protection Handbook is a must-have reference book for the engineer in the field, covering the process of corrosion from a scientific and engineering aspect, along with the prevention of corrosion in industrial applications. It is also a valuable textbook, with the addition of the questions and answers section creating a unique book that is nothing short of groundbreaking. Useful in solving day-to-day problems for the engineer, and serving as a valuable learning tool for the student, this is sure to be an instant contemporary classic and belongs in any engineer's library.