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Advanced Ceramic Coatings and Interfaces III Advanced Ceramic Coatings and Interfaces V Advanced Ceramic Coatings and Interfaces II, Volume 28, Issue 3 Advanced Ceramic Coatings and Interfaces Advanced Ceramic Coatings and Interfaces IV Advanced Ceramic Coatings and Interfaces IV The Mechanics and Reliability of Films, Multilayers and Coatings Functional Coatings Ceramic Fibers and Coatings Advanced Ceramic Coatings and Materials for Extreme Environments, Volume 32, Issue 3 Thinning Films and Tribological Interfaces Nanostructured Materials and Coatings for Biomedical and Sensor Applications Hybrid Organic-Inorganic Interfaces Environmental Barrier Coatings Coatings for Harsh Environments Adhesion Measurement of Films and Coatings Biopolymer Thin Films and Coatings Metallurgical Coatings and Thin Films 1992 Advanced Materials Interfaces Thermal Barrier Coatings: Failure Theory and Evaluation Technology Coatings Materials and Surface Coatings Nanomaterials-Based Coatings Optical Interference Coatings Intermetallic and Ceramic Coatings Protective Thin Coatings Technology Contamination Mitigating Polymeric Coatings for Extreme Environments Nanostructured Films and Coatings Advances in Coatings Deposition and Characterization Thermal Barrier Coatings Coatings Tribology Surface Coatings for Protection Against Wear Polymer Coatings: Technologies and Applications Metallurgical Coatings and Thin Films 1991 Effects of Interface Coating and Nitride Enhancing Additive on Properites of Hi-Nicalon SiC Fiber Reinforced Reaction-bonded Silicon Nitride Composites Metal Magnetic Memory Technique and Its Applications in Remanufacturing Performance of MCrAlX coatings New Pigments and Additives for Corrosion Protection by Organic Coatings The Concise Encyclopedia of the Properties of Materials Surfaces and Interfaces Euromat 99, Interface Controlled Materials Nanocomposite Thin Films and Coatings

Drawing from the third edition of The Coatings Technology Handbook, this text provides a detailed analysis of the raw materials used in the coatings, adhesives, paints, and inks industries. Coatings Materials and Surface Coatings contains chapters covering the latest polymers, carbon resins, and high-temperature materials used for coatings, adhesiv The present volume contains sixteen contributed papers from the symposium, with topics including advanced coating processing, advanced coating for wear, corrosion, and oxidation resistance, and thermal and mechanical properties, highlighting the state-of-the-art ceramic coatings technologies for various critical engineering applications. This eBook is a collection of articles from a Frontiers Research Topic. Frontiers Research Topics are very popular trademarks of the Frontiers Journals Series: they are collections of at least ten articles, all centered on a particular subject. With their unique mix of varied contributions from Original Research to Review Articles, Frontiers Research Topics unify the most influential researchers, the latest key findings and historical advances in a hot research area! Find out more on how to host your own Frontiers Research Topic or contribute to one as an author by contacting the Frontiers Editorial Office: frontiersin.org/about/contact. Proceedings of the NATO Advanced Research Workshop, Santorini, Greece, June 28-30, 1999 Coatings offer the unique opportunity to create architectures that combine the functionality of two or more materials, conferring unique properties to objects with an extremely large palette of solutions. For this flexibility, thick and thin films have terrific impacts on the most relevant societal challenges. Computers, food packaging, airplanes, and cars, to mention a few familiar objects from everyday life, rely heavily on coatings. To celebrate the key role that coatings have in society, and in science and technology, this book collects a selection of relevant reviews and original research articles published in “Coatings” in 2017 and 2018. Papers have been selected based on their broad impact and balancing between the two major aspects of coatings science and technology: deposition and characterization. This book chronicles the proceedings of the International Symposium on Adhesion Measurement of Films and Coatings, held in Boston. The articles in this book were previously published in three special issues of the Journal of Adhesion Science and Technology. Films and coatings are used for a variety of purposes and their adequate adhesion to the underlying substrates is of cardinal importance from practical consideration. In the last two decades there has been brisk activity in devising new ways to measure adhesion or ameliorating the existing techniques. The contributions in this two-volume set represent the work of over two hundred international researchers from universities, government laboratories and industry, with diverse backgrounds and interests in a wide range of coatings and thin film processes. The two hundred and six papers attest to the fact that Metallurgical Coatings is a rapidly growing field attracting experts from the large materials, scientific and technical community. The papers will be a useful and dynamic tool for those wishing to increase their knowledge on metallurgical coatings, as well as providing a guide to recent literature in this field. Effective coatings are essential to counteract the effects of corrosion and degradation of exposed materials in high-temperature environments such as gas turbine engines. Thermal barrier coatings reviews the latest advances in processing and performance of thermal barrier coatings, as well as their failure mechanisms. Part one reviews the materials and structures of thermal barrier coatings. Chapters cover both metallic and ceramic coating materials as well as nanostructured coatings. Part two covers established and advanced processing and spraying techniques, with chapters on the latest advances in plasma spraying and plasma vapour deposition as well as detonation gun spraying. Part three discusses the performance and failure of thermal barrier coatings, including oxidation and hot-corrosion, non-destructive evaluation and new materials, technologies and processes. With its distinguished editors and international team of contributors, Thermal barrier coatings is an essential reference for professional engineers in such industries as energy production, aerospace and chemical engineering as well as academic researchers in materials. Reviews the latest advances in processing and performance of thermal barrier coatings, as well as their failure mechanisms Explores the materials and structures of thermal barrier coatings incorporating cover both metallic and ceramic coating materials as well as nanostructured coating Assesses established and advanced processing and spraying techniques, including plasma vapour deposition and detonation gun spraying The global increase in air travel will require commercial vehicles to be more efficient than ever before. Advanced engine hot section materials are a key technology required to keep fuel consumption and emission to a minimum in next-generation gas turbines. Ceramic matrix composites (CMCs) are the most promising material to revolutionize gas turbine hot section materials technology because of their excellent high-temperature properties. Rapid surface recession due to volatilization by water vapor is the Achilles heel of CMCs. Environmental barrier coatings (EBCs) is an enabling technology for CMCs, since it protects CMCs from water vapor. The first CMC component entered into service in 2016 in a commercial engine, and more CMC components are scheduled to follow within the next few years. One of the most difficult challenges to CMC components is EBC durability, because failure of EBC leads to a rapid reduction in CMC component life. Key contributors to EBC failure include recession, oxidation, degradation by calcium-aluminum-magnesium silicates (CMAS) deposits, thermal and thermo-mechanical strains, particle erosion, and foreign object damage (FOD). Novel EBC chemistries, creative EBC designs, and robust processes are required to meet EBC durability challenges. Engine-relevant testing, characterization, and lifing methods need to be developed to improve EBC reliability. The aim of this Special Issue is to present recent advances in EBC technology to address these issues. In particular, topics of interest include but are not limited to the following: • Novel EBC chemistries and designs; • Processing including plasma spray, suspension plasma spray, solution precursor plasma spray, slurry process, PS-PVD, EB-PVD, and CVD; • Testing, characterization, and modeling; • Lifing. A comprehensive treatment of the mechanics of multilayers and its implications for reliability, with easy-to-use software to compute key results. The structure and thermodynamics of solid surfaces are considered in this single volume. This includes their reactivity and

catalytic role, as well as their tribological features such as friction, lubrication, adhesion and wear. The importance of surface coatings and surface films upon material properties is also reviewed, and a range of articles on the production and characterisation of thin films is included. Approximately one hundred articles have been selected which discuss the above features in a range of material families, e.g.. metallic, ceramic and polymeric. Reviews of the surface properties of wood and paper are also included. * Keep up to date with the pace of developoments in material science and engineering * Designed for quick reference and ease of use combining theory and practice to enhance work flow * Single volume concise reference work for engineers, scientists and consultants working in the field Advanced Material Interfaces is a state-of-the-art look at innovative methodologies and strategies adopted for interfaces and their applications. The 13 chapters are written by eminent researchers not only elaborate complex interfaces fashioned of solids, liquids, and gases, but also ensures cross-disciplinary mixture and blends of physics, chemistry, materials science, engineering and life sciences. Advanced interfaces operate fundamental roles in essentially all integrated devices. It is therefore of the utmost urgency to focus on how newly-discovered fundamental constituents and interfacial progressions can be materialized and used for precise purposes. Interfaces are associated in wide multiplicity of application spectrum from chemical catalysis to drug functions and the advancement is funnelled by fine-tuning of our fundamental understanding of the interface effects. Recent advances in coating development, processing, microstructure and property characterization, and life prediction are included in this book, which came from the proceedings of the 30th International Conference on Advanced Ceramics and Composites, January 22-27, 2006, Cocoa Beach, Florida. Organized and sponsored by The American Ceramic Society and The American Ceramic Society's Engineering Ceramics Division in conjunction with the Nuclear and Environmental Technology Division.. Integrated structural, environmental properties and functionality through advanced coating processing and structural design are emphasized in this book. This book introduces the metal magnetic memory (MMM) technique, one of the nondestructive testing methods, and its applications in remanufacturing engineering. It discusses the advantages of MMM and how to evaluate the early damage degree of remanufacturing cores, as well as the repairing quality of remanufactured components. Various MMM signal characteristics are extracted to reflect the damage degree of remanufacturing cores, coatings and interfaces. All the theoretical models, analysis methods and testing results of MMM in this book provide guidance to control the quality of remanufactured parts and products. This book can help readers make the best use of the MMM technique in remanufacturing engineering. Papers from The American Ceramic Society's 31st International Conference on Advanced Ceramics and Composites, held in Daytona Beach, Florida, January 21-26, 2007. Focuses on recent advances in coating development, processing, structural design, microstructure and property characterization, and life prediction. This book highlights the failure theories and evaluation techniques of thermal barrier coatings, covering the thermal-mechanical–chemical coupling theories, performance and damage characterization techniques, and related evaluations. Thermal barrier coatings are the key thermal protection materials for high-temperature components in advanced aeroengines. Coating spallation is a major technical bottleneck faced by researchers. The extremely complex microstructure, diverse service environments, and failure behaviors bring challenges to the spallation analysis in terms of the selective use of mechanical theories, experimental methods, and testing platforms. In the book, the authors provide a systematic summary of the latest research and technological advances and present their insights and findings in the past couple of decades. This book is not only suitable for researchers and engineers in thermal barrier coatings and related fields but also a good reference for upper-undergraduate and postgraduate students of materials science and mechanics majors. This volume contains papers that were presented at the NATO Advanced Research Workshop on Nanostructured Materials and Coatings for Biomedical and Sensor Applications held in Kyiv, Ukraine, 4-8 August, 2002. A total of 104 scientists from 14 countries participated in our ARW, making it a really international event. Participants ranged from graduate students to senior researchers. They presented 16 tutorial lectures, 20 short talks and more than 70 posters. Invited speakers, from NATO and Partner countries, presented some of the most recent developments in physics, chemistry and technology of nanosized materials. A broad range of speakers having international standing and representing NATO and partner countries, as well as university, industrial and govemment research laboratories participated in this meeting and wrote papers for this volume. Foregoing ARW gathered together the scientists working in the area of nanosized materials and coatings and their applications in biomedicine and sensors. The first objective of this AR W was to discuss the current research covering a wide range of physical and chemical properties of biomaterials and their use. Active discussion of oral presentations and posters, and the round table discussion gave a good opportunity to researchers from academia and industry to discuss the achievements in this field and outline future directions in terms of technological developments and product commercialisation in the fields of biomedicine and sensors. Particularly, advanced ceramics and nanostructured carbons were covered in many presentations. This volume is a useful resource for understanding the most valuable aspects of advanced ceramic coatings and interfaces. Containing twelve contributed papers from the symposium, topics include vibration damping coatings, thermal and environmental barrier coating processing, testing and life modeling, non-destructive evaluation, multifunctional coatings and interfaces, highlighting the state-of-the-art ceramic coatings technologies for various critical engineering applications. MCrAlY coatings (M=Ni and/or Co) are widely used for the protection of superalloy components against oxidation and hot corrosion in the hot sections of gas turbines. The drive for coating systems to bestow adequate oxidation and corrosion resistance upon the components becomes urgent as an inevitable result of the necessary improvement in engine combustion efficiency and service lifetime. Through the careful design of the composition, MCrAlY coating performance can be optimized to meet the needs under different service conditions and component materials, therefore, “MCrAlX”, with “X” stands for the minor alloying elements, is used to highlight the effect. In the present thesis, the performance of new MCrAlX coatings is investigated with respect to oxidation, hot corrosion and interactions between coating-superalloy substrates. Oxidation of MCrAlX coatings can be generally categorized into initial, steady and close-to-end stages. Coating performance can be affected by various factors at different stages, therefore, experiments were designed by targeting the oxidation stages. Investigation on the initial stage oxidation behavior of MCrAlY coatings with post-deposition surface treatments reveals the different growth mechanisms of alumina scales. Surface treatments significantly reduce the alumina growth rate by suppressing transient alumina development and aiding the early formation of ?-Al2O3, which improves the long-term oxidation performance of the coating. Similarly, the modification of minor alloy elements in MCrAlX coatings also serves the purpose. The oxidation behavior of new MCrAlX coatings was investigated at the steady oxidation stage, followed by the microstructure observation, thermodynamic and kinetic simulations. As an alternative reactive element addition of Y, Ce shows a negative effect on the formation of columnar alumina scales of high strain tolerance. In comparison, Fe or Ru addition shows no influence on alumina growth, rather than strengthening the phase stability in the coating and reducing the interdiffusion between coating-substrate through different mechanisms. As the oxidation proceeds to the close-to-end stage, a reliable criterion to estimate the capability of coating to form ?-Al2O3 is of great importance to accurately evaluate coating lifetime. A temperature-dependent critical Al-activity criterion was proposed to better predict the formation of a continuous ?-Al2O3 scale based on correction of elemental activity using thermodynamic database to replace the empirical Al-concentration based criterion. Severe interdiffusion occurs between coating-substrate during high temperature oxidation, accelerating the degradation of the system. Interdiffusion behavior of diffusion couples of superalloys-MCrAlX coatings were examined. It is highlighted that the recrystallization of superficial layer of the substrate contributes to the secondary reaction zone formation and element interdiffusion controls subsequent zone thickening. Study on Type I hot corrosion behavior of new MCrAlX coatings shows that the addition of Fe has no influence on basic fluxing reactions before severe Al depletion from the coating occurs. Instead, it boosts the “effective” Al supply of coating by shifting the equilibrium concentration of Al in the ? phase to a low Al level. Besides, the pre-mature coating degradation at the coating-substrate interface was due to the fast growth of corrosion products from substrate induced large local volume expansions, resulting in early coating spallation. MCrAlY ytbeläggningar (M=Ni och/eller Co) används ofta för att skydda komponenter tillverkade av superlegeringar mot oxidation samt högtemperaturskorrosion i de heta gasturbindelarna. Förbättrad förbränningseffektivitet och livslängd hos gasturbiner, gör att ytbeläggningssystemen måste besitta adekvata oxidations- och korrosionsmotstånd. Genom att omsorgsfullt utforma den kemiska sammansättningen hos MCrAlY ytbeläggningar kan deras prestanda optimeras för att möta kraven från olika driftförhållanden samt olika substratmaterial, därför används beteckningen "MCrAlX" för att belysa förändringar av den kemiska kompositionen, där "X" står för reaktiva legeringsämnen som tillsätts i mindre mängder. I denna avhandling undersöks prestandan hos en ny MCrAlX ytbeläggning med hänsyn till oxidation, högtemperaturskorrosion och interaktionen mellan

ytbeläggningen och superlegeringssubstratet. Oxidation av MCrAlX ytbeläggningar kan generellt kategoriseras i tre faser; initiala, stabila och nära-slutet fasen. Ytbeläggningens prestanda kan påverkas av olika faktorer vid de olika faserna, därför utformades olika experiment för att undersöka de olika oxidationsfaserna. Undersökningen av den initiala fasen av oxidationsbeteendet hos MCrAlX ytbeläggningar som genomgått ytbehandlingar efter ytbeläggningsdeponeringen avslöjade olika tillväxtmekanismer hos aluminiumoxidskikten. Aluminiumoxidens tillväxthastighet reducerades signifikant av ytbehandlingarna, detta genom att undertrycka utvecklingen av övergående aluminiumoxid och bistå den tidiga tillväxten av ?-Al2O3, vilket förbättrar ytbeläggningens oxidationsprestanda långsiktigt. De reaktiva legeringsämnena som tillsätts i mindre mänger påverkar ytbeläggningens oxidationsprestanda på liknande sätt. Oxidationsbeteendet hos de nya MCrAlX ytbeläggningarna i den stabila fasen följdes av mikrostrukturundersökning, termodynamiska och kinetiska simuleringar. Det framkom att Ce visar en negativ effekt på bildandet av kolumnära aluminiumoxidskikt med hög töjningstolerans som alternativt reaktivt legeringsämne till Y. Jämförelsevis ger Fe- eller Ru-tillsatser ingen påverkan på aluminiumoxidtillväxten, förutom att det förstärker fasstabiliteten i ytbeläggningen samt genom olika mekanismer reducerar interdiffusionen mellan ytbeläggningen och substratet. När oxidationsprocessen kommit till nära-slutet fasen, är det viktigt att uppskatta kapaciteten hos en ytbeläggning att bilda ?-Al2O3, detta då det är ett tillförlitligt kriterium för att noggrant kunna utvärdera ytbeläggningens livslängd. Därför föreslogs ett temperaturberoende kriterium för kritisk Al-aktivitet för att bättre kunna förutsäga bildandet av ett kontinuerligt ?-Al2O3-skikt. Kriteriet baserades på korrigering av legeringsämnens aktivitet genom att använda en termodynamisk databas, detta för att ersätta det empiriska Al-koncentrations baserade kriteriet. Vid högtemperatursoxidation sker en omfattande interdiffusion mellan ytbeläggningen och substratet, vilket accelererar degraderingen av ytbeläggningssystemet. Därför har interdiffusionsbeteendet mellan superlegeringssubstratet och MCrAlX ytbeläggningen undersökts i denna avhandling. Det framkom att rekristallisationen av ytliga skikt av substratet bidrar till formationen av den sekundära reaktionszonen och att interdiffusion kontrollerar zonens efterföljande tjocklektillväxt. Undersökningen av Typ I högtemperaturskorrosionsbeteendet hos en ny MCrAlX ytbeläggning visar att legeringstillägg av Fe inte påverkar de grundläggande flödesreaktionerna innan en kritisk Al utarmning sker i ytbeläggningen. Istället stimulerar det tillförseln av Al genom att skifta jämviktskoncentrationen av Al i ? fasen till en låg nivå av Al. Det framkom också att den tidiga degraderingen av ytbeläggningen vid gränsskiktet mellan ytbeläggningen och substratet kommer av att den snabba tillväxten av korrosionsprodukter från substratet inducerade en stor lokal volymsutvidgning, vilket ledde till tidig ytbeläggningsspallation. This book brings together featured papers that relate to several technologically important applications of coatings. These range from non-wetting coatings to underwater resistance and biomedical implant surfaces. In particular, nine interesting coating works have been collected with specific applications in the plasma treatment of polymers for superhydrophobicity, special coatings for glass glazing modification, non-sticky special inorganic coatings for polymeric surfaces, surfactant-controlled cationic polymer self-assembly from solutions, silicone-modified waterborne acrylic emulsion coatings, coating deamination/degradation resistance to corrosive water immersion, surface texturing of concrete to improve coating adhesion, electrochemical polymeric coatings for surgical implants and outdoor fungal growth mechanisms on various polymeric coatings. In terms of coating materials, the researchers have studied polystyrene, acrylic emulsions, epoxy formulations, vinylic polymers, alkyd coats, biopolymers, inorganic alloys such as CrN; CrAlN; CrAlSiN, and cationic polymers. Although the papers are diverse, there are several common attributes that each paper addresses in one way or another. For instance, adhesion failure under certain environmental conditions, hydrophobicity or non-stick performance, effect of substrate texture and resistance to biofouling. The collection will serve as a valuable reference for anyone wishing to stay abreast of the latest advances in the realm of specialized technological coatings. This volume provides perspectives on the approaches, mechanisms, test methods, durability considerations, and environmental concerns for contamination mitigating coatings and polymers with emphasis on their use in more extreme aerospace and marine terrestrial environments. Parts of the Volume are devoted to application of biomimetics to contamination mitigation polymeric coatings, low ice adhesion surfaces, insect residue adhesion resistance coatings, and marine biofouling mitigation materials. By juxtaposing ice insect, and marine mitigation approaches, researchers and users may more easily identify threads of similarity that will assist in future developments and potential applications in these areas. The volume is of interest to chemists and material scientists in providing awareness of both the need for efficacy in mitigating contamination and for appropriate coating durability; to physicists in providing better understanding of the interaction between the contaminant, the coated surface, and the surrounding environment; and to engineers in describing the need for better scale-up tests between laboratory and field environments. Hard or protective coatings are widely used in conventional and modern industries and will continue to play a key role in future manufacturing, especially in the micro and nano areas. Protective Thin Coatings Technology highlights the developments and advances in the preparation, characterization, and applications of protective micro-/nanoscaled films and coatings. This book Covers technologies for sputtering of flexible hard nanocoatings, deposition of solid lubricating films, and multilayer transition metal nitrides Describes integrated nanomechanical characterization of hard coatings, corrosion and tribo-corrosion of hard coatings, and high entropy alloy films and coatings Investigates thin films and coatings for high-temperature applications, nanocomposite coatings on magnesium alloys, and the correlation between coating properties and industrial applications Features various aspects of hard coatings, covering advanced sputtering technologies, structural characterizations, and simulations, as well as applications This first volume in the two-volume set, Protective Thin Coatings and Functional Thin Films Technology, will benefit industry professionals and researchers working in areas related to semiconductors, optoelectronics, plasma technology, solid-state energy storages, and 5G, as well as advanced students studying electrical, mechanical, chemical, and material engineering. In science as well as in industry, the impetus of research on bio-based polymers has recently expanded into new terrains. The need to replace fossil-based materials with sustainable and renewable sources is one of the main drivers for the emergence and the development of new and environmentally friendly materials. While some materials applications of bio-based polymers are already very well established, for instance, in paper and textiles, others have just emerged with thin films and coatings being a recent and particular area of interest. Thin films in general are an enormous field of research both fundamentally and from an applied perspective, with uses ranging from corrosion resistance to photovoltaics and sensors. Since bio-based materials are a relatively novel source material for thin films, the research in this area is at a fresh, exciting stage at the moment. Hybrid organic-inorganic materials and the rational design of their interfaces open up the access to a wide spectrum of functionalities not achievable with traditional concepts of materials science. This innovative class of materials has a major impact in many application domains such as optics, electronics, mechanics, energy storage and conversion, protective coatings, catalysis, sensing and nanomedicine. The properties of these materials do not only depend on the chemical structure, and the mutual interaction between their nano-scale building blocks, but are also strongly influenced by the interfaces they share. This handbook focuses on the most recent investigations concerning the design, control, and dynamics of hybrid organic-inorganic interfaces, covering: (i) characterization methods of interfaces, (ii) innovative computational approaches and simulation of interaction processes, (iii) in-situ studies of dynamic aspects controlling the formation of these interfaces, and (iv) the role of the interface for process optimization, devices, and applications in such areas as optics, electronics, energy and medicine. This volume is a useful resource for understanding the most valuable aspects of advanced ceramic coatings and interfaces. Containing twelve contributed papers from the symposium, topics include vibration damping coatings, thermal and environmental barrier coating processing, testing and life modeling, non-destructive evaluation, multifunctional coatings and interfaces, highlighting the state-of-the-art ceramic coatings technologies for various critical engineering applications. Detailing the properties of specific coatings, problems related to adhesion onto various substrates, and potential commercial applications, this text surveys up-to-date techniques involved in preparing intermetallic and ceramic coatings. The book features a list of selected applications covering the latest industrially available practices. High-temperature ceramic fibers are the key components of ceramic matrix composites (CMCs). Ceramic fiber properties (strength, temperature and creep resistance, for example)-along with the debonding characteristics of their coatings-determine the properties of CMCs. This report outlines the state of the art in high-temperature ceramic fibers and coatings, assesses fibers and coatings in terms of future needs, and recommends promising avenues of research. CMCs are also discussed in this report to provide a context for discussing high-temperature ceramic fibers and coatings. Strong and tough Hi-Nicalon SiC fiber reinforced reaction-bonded silicon nitride matirix composites (SiC/RBSN) have been fabricated by the fiber lay-up approach. Commercially available uncoated and PBN, PBN/Si-rich PBN, and BN/SiC coated SiC Hi-

Nicalon fiber tows were used as reinforcement. The composites contained ~24 vol % of aligned 14 ♯m diameter SiC fibers in a porous RBSN matrix. Both one- and two-dimensional composites were characterized. The effects of interface coating composition, and the nitridation enhancing additive, NiO, on the room temperature physical, tensile, and interfacial shear strenght properties of SiC/RBSN matrix composites were evaluated. Results indicate that all three coated fibers, the thickness of the coating decreased from the outer periphery to the interior of the tows, and that from 10 to 30 percent of the fibers were not covered with the interface coating. As wear is a surface or near surface phenomenon it has long been realised that the wear resistance of a component can be improved by providing a surface of different composition from the bulk material. Although this book concentrates on surface coatings, the distinction between surface coatings and the process of modifying the surface by changing its composition is not always clear, so some useful surface modification techniques are also considered. Surface coatings for protection against wear, consists of twelve chapters written by different authors, experts in their field. After a brief introductory chapter wear phenomena and the properties required from a coating are addressed. Chapter three covers coating characterisation and property evaluation relevant to wear resistance with an emphasis on mechanical testing of coatings. The next chapter provides an introduction to the various methods available to deposit wear resistant coatings. The following six chapters describe in detail wear resistant coatings produced by various deposition routes. Emphasis is placed on the microstructure property relationship in these coatings. Chapter eleven addresses coatings and hardfacings, produced from welding processes, specifically modern developments such as friction surfacing and pulsed electrode surfacing techniques. The final chapter is dedicated to future trends in both coating materials and coating processes. Surface coatings for protection against wear is essential for anyone involved in selecting coatings and processes and will be an invaluable reference resource for all engineers and students concerned with the latest developments in coatings technology. Essential for anyone involved in selecting coatings and processes, engineers and students Written by an international team of experts in the field One of the increasingly important requirements for high technology materials is that they possess near-surface properties different to their bulk properties. Specific surface properties are generally achieved through the use of these films or coatings or by modifying the structure or composition of the near surface. This two-volume work contains 157 papers covering a wide range of topics involving films, coatings, and modified surfaces. All aspects of the development of deposition technologies are addressed including basic research, applied research, applications development and full scale industrial production. The work will be of interest to materials scientists, physicists, electronic, chemical and mechanical engineers, and chemists. This collection of fully peer-reviewed papers were presented at the 26th Leeds-Lyon Tribology Symposium which was held in Leeds, UK, 14-17 September, 1999. The Leeds-Lyon Symposia on Tribology were launched in 1974, and the large number of references to original work published in the Proceedings over many years confirms the quality of the published papers. It also indicates that the volumes have served their purpose and become a recognised feature of the tribological literature. This year's title is 'Thinning Films and Tribological Interfaces', and the papers cover practical applications of tribological solutions in a wide range of situations. The evolution of a full peer review process has been evident for a number of years. An important feature of the Leeds-Lyon Symposia is the presentation of current research findings. This remains an essential feature of the meetings, but for the 26th Symposium authors were invited to submit their papers for review a few weeks in advance of the Symposium. This provided an opportunity to discuss recommendations for modifications with the authors. 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. Emcompasses three major parts of the development of nanocomposite films and coatings: processing and properties; mechanical performance; functional performance; and includes wide application areas ranging from mechanical cutting to solar energy and from electronics to medicine. Designed to give a concise but complete overview of the field, this book features contributions written by leading experts in the various areas. Topics include design, materials, film growth, deposition including large area, characterization and monitoring, and mechanical stress. This book is a collection of papers from The American Ceramic Society's 35th International Conference on Advanced Ceramics and Composites, held in Daytona Beach, Florida, January 23-28, 2011. This issue includes papers presented in the Advanced Ceramic Coatings for Structural, Environmental, and Functional Applications and Materials for Extreme Environments symposia on topics such as Coatings to Resist Wear, Erosion and Tribological Loadings; Environmental Barrier Coatings; Functionally Graded Coatings and Interfaces; Thermal Barrier Coatings; and Ultrahigh Temperature Ceramics and Nanolaminated Ternary Carbides and Nitrides (MAX Phases). Polymer Coatings: Technologies and Applications provides a comprehensive account of the recent developments in polymer coatings encompassing novel methods, techniques, and a broad spectrum of applications. The chapters explore the key aspects of polymer coatings while highlighting fundamental research, different types of polymer coatings, and technology advances. This book also integrates the various aspects of these materials from synthesis to application. Current status, trends, future directions, and opportunities are also discussed. FEATURES Examines the basics to the most recent advances in all areas of polymer coatings Serves as a one-stop reference Discusses polymer-coated nanocrystals and coatings based on nanocomposites Describes morphology, spectroscopic analysis, adhesion, and rheology of polymer coatings Explores conducting, stimuli-responsive, self-healing, hydrophobic and hydrophilic, antifouling, and antibacterial polymer coatings Covers modeling and simulation With contributions from the top international researchers from industry, academia, government, and private research institutions, both new and experienced readers will benefit from this applications-oriented book. Sanjay Mavinkere Rangappa is a research scientist at the Natural Composites Research Group Lab, Academic Enhancement Department, King Mongkut’s University of Technology North Bangkok, Thailand. Jyotishkumar Parameswaranpillai is a research professor at the Center of Innovation in Design and Engineering for Manufacturing, King Mongkut’s University of Technology North Bangkok, Thailand. Suchart Siengchin is a professor at and president of King Mongkut’s University of Technology North Bangkok, Thailand. A common feature of advanced functional materials - such as thin films, layered structures and all kinds of nanoscale materials (ultrafine powders, polycrystals, nanocomposites, nanoporous or nanotubular materials) - is that their properties are mainly influenced by the structure and composition of their surfaces and interfaces. This book discusses the processing, fabrication, structure, properties and applications of such interface-controlled materials, highlighting the problem of determining the structure and properties of these advanced materials by different techniques. This volume provides a one-stop resource, compiling current research on ceramic coatings and interfaces. It is a collection of papers from The American Ceramic Society s 32nd International Conference on Advanced Ceramics and Composites, January 27-February 1, 2008. Papers include developments and advances in ceramic coatings for structural, environmental, and functional applications. Articles are logically organized to provide insight into various aspects of ceramic coatings and interfaces. This is a valuable, up-to-date resource for researchers in industry, government, or academia who work in ceramics engineering. The surface coating field is a rapidly developing area of science and technology that offers new methods and techniques to control friction and wear. New coating types are continually being developed and the potential applications in different industrial fields are ever growing, ranging from machine components and consumer products to medical instruments and prostheses. This book provides an extensive review of the latest technology in the field, addressing techniques such as physical and chemical vapour deposition, the tribological properties of coatings, and coating characterization and performance evaluation techniques. Eleven different cases are examined in close detail to demonstrate the improvement of tribological properties and a guide to selecting coatings is also provided. This second edition is still the only monograph in the field to give a holistic view of the subject and presents all aspects, including test and performance data as well as insights into mechanisms and interactions, thus providing the level of understanding vital for the practical application of coatings. * An extensive review of the latest developments in the field of surface coatings * Presents both theory and practical applications * Includes a guide for selecting coatings Nanomaterials-Based Coatings: Fundamentals and Applications presents the fundamental concepts and applications of nanomaterial-based coatings in anticorrosion, antiwear, antibacterial, antifungal,

self-cleaning, superhydrophobic, super hard, super heat resistance, solar reflective, photocatalytic and radar absorbing coatings. It is an important resource for those seeking to understand the underlying phenomenal and fundamental mechanisms through which nanoparticles interact with polymeric and metallic matrices to create stronger coatings. As nanomaterials-enforced coatings are smarter, stronger and more durable, the information listed in this book will helps readers understand their usage and further applications. Highlights the latest methods in design, preparation and characterization techniques for nanomaterials-based coatings Discusses emerging applications of nanomaterials-based coatings, including substrates protection, sustainable energy, and in the environment and healthcare Assesses the major challenges in making nanomaterials-based coatings more reliable and cost-effective

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