Optical Thin Film Software | f50ab2943c7376b6c2e79d51517a8


This book bridges the gap between fundamental physics courses (such as optics, electromagnetics, quantum mechanics and solid state physics) and highly specialized literature on the spectroscopy, design, and application of optical thin film coatings. Basic knowledge from the above-mentioned courses is therefore presumed. Starting from fundamental physics, the book enables the reader to derive the theory of optical coatings and to apply it to practically important spectroscopic problems. Both classical and semiclassical approaches are included. Examples describe the full range of optical coatings in various spectral regions as well as highly specialized new topics such as nacre filters and resonant grating waveguide structures. The second edition has been updated and extended with respect to probing matter in different spectral regions. This book is intended to be used as a textbook for students and researchers who need a practical view of optical interference coatings. It is written as an optical technology reference book for development and production engineers. With contributions from worldwide experts, this book aids in mitigating the risk in adopting new asphere production technologies.

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. The book is devoted to the design, application and characterization of thin films and structures, with special emphasis on optical applications. It comprises ten papers—five featured and five regular—authored by scientists all over the world. Diverse materials are studied and their possible applications are demonstrated and discussed—transparent conductive coatings and structures from ZnO doped with Al and Ga and Ti-doped SnO2, polymers and nanostructured zeolite thin films, for optical sensing, TiO2 and linear and nonlinear optical properties, organic diamagnetic materials, broadband optical coatings, CVD glass mold coatings, and silicon on insulator waveguides.

Modern industry imposes ever increasing requirements upon tools and tool materials as to the provision for performance under the conditions of high cutting speeds and dynamic loads as well as under intensive thermal and chemical interactions with workplace materials. The industry demands a higher productivity in combination with the accuracy of geometry and dimensions of workpieces and quality of working surfaces of the machined objects. These requirements are best met by the tool superhard materials (diamond and diamond-like cubic boron nitride). Ceramics based on silicon carbide, aluminum and boron oxides as well as on titantium, silicon and aluminium nitrides offer high strength, high hardness (tensile strength of 1500—2500MPa) and high wear resistance. These materials are considered as high-strength super high hardness composites based on the above materials. At all the requirements imposed by machining jobs when manufacturing elements of machinery, in particular those operating under the extreme conditions of high temperatures and loads. These elements are produced of difficult–machine high-alloy steels, refractory alloys, high-tech ceramics, materials with metallic and non-metallic properties. These materials have improved wear resistance, as well as of special polymeric and glass–ceramic materials. Materials science at high pressure deals with the use of high-pressure techniques for the development and production of unique materials whose preparation at ambient pressure is impossible (e.g. diamond, cubic boron nitride, etc.) or of materials with properties exceeding those of materials produced at ambient pressure (e.g. high-temperature superconductors).

Energy Saving Coating Materials: Design, Process, Implementation and Developments provides comprehensive information regarding recent materials advancements and design aspects and integration for infra-red radiation regulators, along with future developments of zero emission buildings. The key opportunities and challenges for the usage of existing heat regulation materials and their implementation for commercial aspects are explained. The fundamental interaction between electromagnetic waves and materials is described throughout, along with materials synthesis, design and integration of coatings for smart window applications. This book presents recent developments of innovative technologies comprising energy saving materials and coatings which are key considerations for achieving vital energy saving milestones. Provides knowledge-based information on the optical properties of materials and their utility for solar energy harvesting and energy saving applications. Discusses innovative coatings for smart windows applications, including the progressive development of radiative cooling and cool paint. Provides future developments for the synthesis, design and integration of heat reflective materials.

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.

Modern optical systems rely on leading-edge production technologies, especially when using aspherical optical elements. Due to the inherent complexity of aspheres, all efforts to push the technological limits are risky. Thus, to minimize risk, clear decisions based on a good understanding of technology are indispensable. This compendium is written as an optical technology reference book for development and production engineers. With contributions from worldwide experts, this book aids in mitigating the risk in adopting new aspheric production technologies.

Optical Thin Films and Coatings: From Materials to Applications, Second Edition, provides an overview of thin film coatings and their properties, design and applications across a wide variety of application sectors. Examples explore the design of thin film coating materials and their unconventional characteristics, including the scattering properties of random structures in thin films, optical properties at short wavelengths, thermal properties and color effects. Other chapters focus on novel materials, including organic optical coatings, surface microsensors, optical thin films containing quantum dots, and optical coatings, including laser components, solar cells, displays and lighting, and architectural and automotive glass. The book presents a technical resource for researchers and engineers working with optical thin films and coatings. It is also ideal for professionals in the security, automotive, space and other industries who need an understanding of the topic. Provides thorough review of applications of optical coatings including laser components, solar cells, optical, displays and lighting One-stop reference that addresses deposition technologies, design and applications of optical thin films and coatings. Novel methods, features for coatings, and applications makes this a valuable resource for experts in the field as well.

Global electro-optic technology and markets.

Today's solar cell multi-GW market is dominated by crystalline silicon (c-Si), however, new cell concepts are entering the market. One promising solar cell design to answer these needs is the silicon hetero-junction solar cell, of which the emitter and back surface field are basically produced by a low temperature growth of ultra-thin layers of amorphous silicon. Other studies focus on novel materials, including organic optical coatings, surface microsensors, optical thin films containing quantum dots, and optical coatings, including laser components, solar cells, displays and lighting, and architectural and automotive glass.

The book presents a technical resource for researchers and engineers working with optical thin films and coatings. It is also ideal for professionals in the security, automotive, space and other industries who need an understanding of the topic. Provides thorough review of applications of optical coatings including laser components, solar cells, optical, displays and lighting One-stop reference that addresses deposition technologies, design and applications of optical thin films and coatings. Novel methods, features for coatings, and applications makes this a valuable resource for experts in the field as well.

We describe an optical coating design suitable for broadband high-reflection (BBHR) at 45° angle of incidence (AOI). P Polartization (P) of femtosecond (fs) laser pulses whose wavelengths range from 800 to 1000 nm. The design process is guided by quarter-wave HR coating properties. Our design must afford low group delay dispersion (GDD) for reflected light over the broad, 200 nm bandwidth in order to minimize temporal broadening of the fs pulses due to dispersive attenuation and selectivities between their frequency components. The design should also be highly fit to laser-induced damage threshold (LIDT). We base the coating on TiO2/SiO2 layer...
pairs produced by means of e-beam evaporation with ion-assisted deposition, and use OptiLayer Thin Film Software to explore designs starting with TiO2/SiO2 layers having thicknesses in a reverse chirped arrangement. This approach led to a design with $R > 99\%$ from 800 to 1000 nm and GDD.