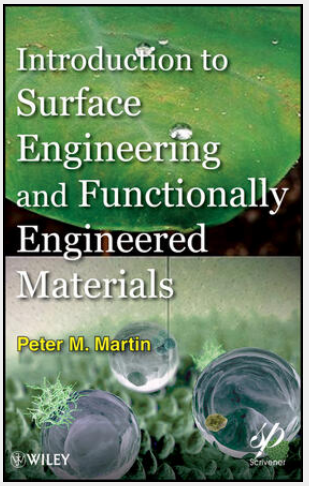
Martin

Introduction to Surface Engineering and Functionally Engineered Materials



This book provides a clear and understandable text for users and developers of advanced engineered materials, particularly in the area of thin films, and addresses fundamentals of modifying the optical, electrical, photo-electric, triboligical, and corrosion resistance of solid surfaces and adding functionality to solids by engineering their surface, structure, and electronic, magnetic and optical structure. Thin film applications are emphasized. Through the inclusion of multiple clear examples of the technologies, how to use them,and the synthesis processes involved, the reader will gain a deep understanding of the purpose, goals, and methodology of surface engineering and engineered materials. Virtually every advance in thin film, energy, medical, tribological materials technologies has resulted from surface engineering and engineered materials. Surface engineering involves structures and compositions not found naturally in solids and is used to modify the surface properties of solids and involves application of thin film coatings, surface functionalization and activation, and plasma treatment. Engineered materials are the future of thin film technology. Engineered structures such as superlattices, nanolaminates, nanotubes, nanocomposites, smart materials, photonic bandgap materials, metamaterials, molecularly doped polymers and structured materials all have the capacity to expand and increase the functionality of thin films and coatings used in a variety of applications and provide new applications. New advanced deposition processes and hybrid processes are being used and developed to deposit advanced thin film materials and structures not possible with conventional techniques a decade ago. Properties can now be engineered into thin films that achieve performance not possible a decade ago.

Incorporates in a single resource all aspects of surface engineering, including tribological, optical, electrical and electro-optic coatings as well as functionally engineered structures and materials. Introduction to Surface Engineering and Functionally Engineered Materials provides a clear and understandable text for users and developers of advanced engineered materials, particularly in the area of thin films. It addresses the fundamentals of modifying the optical, electrical, photo-electric, tribological, and corrosion resistance of solid surfaces, and how to add functionality to solids by engineering their surface, electronic, magnetic and optical structure and properties. Thin film applications are emphasized. Through the inclusion of multiple clear examples of the technologies, how to use them, and the synthesis processes involved, the reader will gain a deep understanding of the purpose, goals, and methodology of surface engineering and engineered materials. This comprehensive and authoritative introduction includes chapters on: * Properties of solid surfaces * Thin film deposition processes * Thin film structure and defects * Thin film tribological materials * Optical thin films and composites * Fabrication process for electrical and electro-optical thin films * Functionally engineered materials * Multifunctional surface engineering applications * Bio-inspired materials and surfaces The book will used by engineers, materials scientists, and product developers in industry who work, for instance, with thin films, surfaces, coatings, optics, corrosion, nanotechnology, and plasma. Students, faculty, and the research community (government, industrial, and university labs) will find this book of great importance as well.

217,50 €
203,27 € (zzgl. MwSt.)

Lieferfrist: bis zu 10 Tage

Artikelnummer: 9780470639276
Medium: Buch
ISBN: 978-0-470-63927-6
Verlag: Wiley
Erscheinungstermin: 06.09.2011
Sprache(n): Englisch
Auflage: 1. Auflage 2011
Serie: Wiley-Scrivener
Produktform: Gebunden
Gewicht: 998 g
Seiten: 584
Format (B x H): 160 x 236 mm

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