1. Record Nr. UNINA9911039325303321

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Titolo	Plasma Electrolytic Oxidation – Fundamentals, Advances and Applications : Edition Details / / edited by Viswanathan S. Saji, Mikhail Zheludkevich
Pubbl/distr/stampa	Cham : , : Springer Nature Switzerland : , : Imprint : Springer, , 2025
ISBN	9783031924293 9783031924286
Edizione	[1st ed. 2025.]
Descrizione fisica	1 online resource (750 pages)
Collana	Chemistry and Materials Science Series
Disciplina	660.044
Soggetti	Surfaces (Technology) Thin films Metals Coatings Photocatalysis Materials Surfaces, Interfaces and Thin Film Metals and Alloys
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Plasma electrolytic oxidation: Fundamentals -- PEO by AC, DC and pulsed DC – Advantages, challenges and effects of electrolyte/electrode parameters -- Mechanistic aspects of PEO from the perspective of sparking discharge regimes and the role of ‘soft’ sparking. -- Unconventional PEO approaches (two-step PEO, laser-assisted PEO, ionic liquid / molten salt-assisted PEO, Cathodic PEO etc.) -- Effect of PEO on the mechanical properties of various metallic substrates (including fracture behaviours of PEO coatings) -- Growth mechanism of PEO on valve metals (Al, Ti and Mg) -- Growth mechanism of PEO on non-valve metals -- Growth mechanism of PEO on metal-matrix composites -- The colouring mechanism of PEO films -- Computational modelling studies on PEO -- PEO composite coatings with enhanced corrosion and wear resistance via particles incorporation -- Functionalization of PEO coatings via particles addition -- PEO

coatings containing nanocarbons -- Biomedical PEO composite coatings (calcium phosphate, bioceramics etc.) -- Advances in anti-corrosion PEO coatings for light-weight materials (Al and Mg alloys) -- Advances in anti-wear PEO coatings for light-weight materials (Al and Mg alloys) -- Advances in anti-corrosion and anti-wear PEO coatings for Ti and its alloys -- Advances in anti-corrosion and anti-wear PEO coatings for steel and other alloys -- High-temperature oxidation/hot corrosion of PEO coatings -- Active corrosion protection coatings based on PEO (including multi-layer and self-healing coatings) -- PEO in photocatalysis and photoelectrochemical catalysis -- PEO in chemical and electrochemical catalysis -- PEO in battery applications (Li-ion battery, Li metal batteries etc.) -- Post-treatment sealing strategies for PEO coatings (organic and inorganic sealing-treatment, hydrothermally treated PEO composite coating).

Sommario/riassunto

This volume provides the fundamentals and most recent information on Plasma Electrolytic Oxidation (PEO) in one authoritative resource. The authors explain how PEO has attracted significant research attention in the last decade as a potential industrial method for surface engineering of metals and alloys in various application domains. It further documents their advantages in producing thicker and more effective coatings over conventional industrial anodization processes and that PEO coatings can be used as anticorrosion and anti-wear coatings, thermal barrier layers and catalytic layers. The book is divided into four sections addressing fundamentals, growth mechanisms, effects of particles, and industrial applications. Promoting maximum understanding of the fundamentals of the PEO process as essential to developing more competitive surface technologies, the book is ideal for a range of engineers and fabricators working in metals and alloys, surface modification, corrosion, electrochemistry, materials chemistry, and nanotechnology. Stands as a practical reference for researchers, students, and professionals concerned with surface engineering Provides detail on constructing PEO-based ceramic and composite coatings, particularly on valve metals and alloys Describes how coatings manufactured from the PEO process are superior to their anodic oxidation equivalents.