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Autore	Croley Thomas E
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Autore	Aliofkhazraei Mahmood
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Altri autori (Persone)	RouhaghdamAlireza Sabour
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Nota di contenuto	Fabrication of Nanostructures by Plasma Electrolysis; Contents; Preface; 1 Synthesis and Processing of Nanostructured Films, and Introduction to and Comparison with Plasma Electrolysis; 1.1 Why Nanostructures Are Important; 1.2 Different Types of Nanostructures; 1.3 Ability of Plasma Electrolysis in Nanostructure Fabrication; 1.4 Relation Between Plasma Electrolysis and Nanotechnology; 1.5 Growth Process of Nanostructured Films; 1.6 Electrolyte-Based Methods; 1.6.1 Electrodeposition; 1.6.2 Electroless Deposition; 1.6.3 Plasma Electrolysis; 1.7 Non-Electrolyte-Based Methods; 1.7.1 Hydrolysis 1.7.2 Hydrothermal1.7.3 Sol-Gel Methods; 1.8 Introduction to Plasma Electrolysis; References; 2 Introduction to Plasma Concepts and Discharge Configurations; 2.1 What Is Plasma?; 2.2 Plasma Categorization; 2.3 Atmospheric Pressure Plasmas; 2.4 Applications of Atmospheric Plasma Methods; 2.4.1 Spectroscopic Analysis; 2.4.2 Material Processing; 2.4.3 Surface Treatments; 2.4.3.1 Surface Pre-Treatments; 2.4.3.2 Surface Coating; 2.4.4 Bulk Material Treatments; 2.5 Optimization of Plasma Parameters for Fabrication of Uniform Nanostructures 2.5.1 Design of Orthogonal Array and Signal-to-Noise Analysis2.5.1.1

Analysis of Variance (ANOVA); 2.5.1.2 Size of Nanocrystalline Carbonitrides of Coatings; 2.5.1.3 Determination of Optimal Levels; 2.5.1.4 Confirmation Run; 2.5.2 Surface Response Method; References; 3 Characterization of Nanocrystalline Hard Coatings and their Use for Layers Fabricated by Plasma Electrolysis; 3.1 Evaluation of Hardness for Nanostructured Coatings; 3.2 Characterization of Nanostructured Coatings by X-Ray Diffraction and Nuclear Reaction Analysis; 3.3 Evaluation of Plasma Electrolytic Layers
3.3.1 Average Size of Nanocrystallites for PE Layers3.3.2 Mechanical Properties for PE Layers; 3.3.3 Electrochemical Properties for PE Layers; 3.3.4 Coating Roughness for PE Layers; References; 4 Nanocrystalline Plasma Electrolytic Saturation; 4.1 Classification of Plasma Electrolysis; 4.2 Nanostructures Fabricated by the Plasma Electrolytic Saturation Process; 4.3 Characteristics of Cathodic Plasma Electrolysis; 4.3.1 Current-Voltage Trend; 4.3.2 Electrolyte; 4.3.3 Substrates; 4.4 Mechanism of Cathodic Plasma Electrolysis; 4.5 Morphological Aspects of Achieved Nanostructures
4.5.1 Correlation Among Nanostructure and Properties of Layers4.5.2 Electrochemical Properties of Nanostructured Layers; 4.5.3 Mechanical Properties of Nanostructured Layers; References; 5 Corrosion Properties of Nanostructured Coatings Made by Plasma Electrolytic Saturation; 5.1 Anti-Corrosion Properties of Nanostructured PES Coatings; 5.2 Relation Among Nanostructure and Corrosion Properties; 5.3 Optimization of Plasma Electrolytic Saturation Treatment; 5.3.1 Applied Voltage; 5.3.2 Applied Current; 5.3.3 Treatment Time; 5.3.4 Electrolyte Composition; 5.3.5 Pulse Parameters
5.3.5.1 Frequency and Duty Cycle

Sommario/riassunto

In this handbook and ready reference, the authors introduce the concept of plasma electrolysis, explaining how the coatings are characterized and discussing their mechanical and corrosion properties. They then go on to look at specific industrial applications of this powerful and low-cost method, including aerospace, the biomaterials industry as well as in the oil and gas industry.