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Nota di contenuto	Electrocrystallization in Nanotechnology; Contents; Preface; List of Contributors; I Fundamentals; 1 The Impact of Electrocrystallization on Nanotechnology; 1.1 Introduction; 1.2 Thermodynamic Properties of Large and Small Phases; 1.2.1 The State of Thermodynamic Equilibrium; 1.2.2 Electrochemical Supersaturation and Undersaturation; 1.2.3 The Thermodynamic Work for Nucleus Formation; 1.2.3.1 Classical Nucleation Theory; 1.2.3.2 Atomistic Nucleation Theory; 1.3 Kinetics of Nucleus Formation in Electrocrystallization 1.4 Energy State of the Electrode Surface and Spatial Distribution of Nanoclusters1.5 Electrochemical Growth of Nanoparticles and Ultrathin Films; 1.5.1 Growth of 3D Nanoclusters; 1.5.2 Growth of 2D Nanoclusters and Formation of UPD Monolayers; 1.6 Localization of Electrocrystallization Processes and Nanostructuring; 1.7 Conclusion; Acknowledgments; References; 2 Computer Simulations of Electrochemical Low-dimensional Metal Phase Formation; 2.1 Introduction; 2.2 Molecular Dynamics Simulations; 2.2.1 Generalities; 2.2.2 Nanostructuring of Metallic Surfaces; 2.3 Monte Carlo Method 2.3.1 Generalities2.3.2 Off-lattice Models; 2.3.2.1 Stability of Metallic

Nanostructures; 2.3.3 Lattice Models; 2.3.3.1 Introduction; 2.3.3.2 Electrocrystallization; 2.3.3.3 Dynamics of Crystal Growth; 2.3.3.4 Simulation of a Complex Underpotential Deposition System; 2.4 Brownian and Langevin Dynamics Simulations; 2.4.1 Generalities; 2.4.2 Applications in Electrochemical Nanostructuring and Crystal Growth; 2.5 Conclusions and Outlook; Acknowledgments; References; 3 Electrodeposition of Metals in Templates and STM Tip-generated 0D Nanocavities; 3.1 Introduction; 3.2 Bottom-up Template Approach
3.3 Top-down SPM Approach3.4 Thermodynamics of Low-dimensional Phases; 3.5 Experiments on the Electrodeposition in STM-tip-generated Nanocavities; 3.6 Underpotential Behavior of Bismuth on Gold; 3.7 Zero-dimensional Bi Deposition; 3.8 Conclusions; Acknowledgment; References; 4 Nanoscale Electrocrystallization of Metals and Semiconductors from Ionic Liquids; 4.1 Introduction; 4.2 Some Electrochemical and Interfacial Characteristics of Ionic Liquids (ILs); 4.3 Variable Temperature Electrochemical SPM Technique for Studies with Ionic Liquids
4.4 Underpotential Deposition of Metals: Phase Formation and Transitions4.4.1 Ag on Au(111): Aqueous versus Ionic Liquid Electrolytes; 4.4.2 Zn on Au(111): Spinodal Decomposition and Surface Alloying; 4.5 Overpotential Deposition of Metals, Alloys and Semiconductors; 4.5.1 Co-Al, Ni-Al and Ti-Al Alloy Deposition; 4.5.2 Nanoscale Growth of Al-Sb Compound Semiconductors; 4.6 Concluding Remarks; Acknowledgment; References; 5 Superconformal Film Growth; 5.1 Introduction; 5.2 Competitive Adsorption: Inhibition versus Acceleration
5.3 Quantifying the Impact of Competitive Adsorption on Metal Deposition Kinetics

Sommario/riassunto

Here, the well-known editor in the field of electrocrystallization and his team of excellent international authors guarantee the high quality of the contributions.Clearly structured in two main parts, this book reviews the fundamentals and applications of electrocrystallization processes in nanotechnology. The first part, ""Fundamentals"" covers the basic concepts of electrocrystallization, computer simulations of low-dimensional metal phase formation, electrodeposition in templates and nanocavities, nanoscale electrocrystallization from ionic liquids, and superconformal electrodeposition