

Preface

The book reflects in a concise form the modern state of both theoretical and applied aspects of metal electrodeposition. The theoretical part concerns the electrochemistry of metals and includes a discussion of electrochemical thermodynamics and kinetics, the structure at the metal/electrolyte interface, nucleation, growth and morphology of metals and alloys, and current distribution. The applied part contains general information on the applications of metallic coatings, their selection, electrochemical basics and technology of deposition of selected metals and alloys, including individual peculiarities, properties and structure of coatings, testing and characterization. The book includes, where possible at an elementary level, a quantitative discussion of phenomena of relevance, providing formulas for the calculation of important quantities. Additionally, it contains information on surface leveling, hydrogenation, inclusion of impurities, physical properties of deposits, that is rarely available in textbooks on electrodeposition. The section on electrodeposition technology includes the most important processes and chemistries; information on any definite material system is provided using a unified scheme, namely: properties of the coating, advantages and disadvantages, solution chemistries and methods of preparation, peculiarities, anodes, and additives.

The essential concepts in theoretical electrochemistry necessary for the investigation of metal deposition processes is provided here, including data that are commonly absent in specialized academic courses. These topics are important for the reader aiming to achieve a thorough understanding of the latest scientific publications in this field. Information on different aspects of the process of electrolytic crystallization is gathered here from a large body of publications and is considered from a unified point of view.

The book is suitable for professional electrochemists, advanced undergraduate and postgraduate students and also for electrodeposition specialists with a physical, technical or chemical education. It can also be useful for engineers and specialists engaged in research on new electrodeposition technologies related to metallic layers, crystals and other metallic objects.

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