BOOK SECTION

ELECTROCHEMICAL PHASE FORMATION AND GROWTH An Introduction to the Initial Stages of Metal Deposition E.Budevski, G.Steikov and W.J.Lorenz *VCH Verlagsgesellschaft mbH,* D-69451 Weinheim FEDERAL REPUBLIC OF GERMANY ISBN 3-527-29422-8 (1996) 410 pages

Electrodeposition is one of the widely applied areas of electrochemistry. Although it is considered more as an art than a science, there are several important scientific aspects involved in electrodeposition process. There are only a few books which have discussed and reviewed the fundamental aspects of electrodeposition. This book belongs such a rare category. Although the book is divided into ten chapters, important topics are covered under chapters second through sixth.

The first chapter, which spans only seven pages, thermodynamics, kinetics and mechanisms are briefly introduced as a prelude to the rest of the chapters.

The second chapter titled **Crystalline Metal Surfaces** contains structural aspects, atomic dynamics and surface profile mobility as broad topics. It is highlighted that the thermodynamic and kinetic properties of a crystalline substrate / electrolyte interface are determined by the surface structure and also the nature, density and distribution of surface inhomogeneities. The third chapter is titled **Underpotential deposition of metals - 2D phases.** This chapter commences with a historical background on underpotential deposition of metals. Basic thermodynamic and kinetic aspects involved in the process are discussed. The influences of the substrate and its crystallographic orientation are clearly discussed by presenting several cyclic voltammograms and adsorption isotherms. Several fundamental aspects involved in 2D and 3D underpotential metal and alloy depositions are discussed. In the fourth chapter entitled **Initial stages of bulk phase formation,** crystal nucleation - grpwth equilibrium, crystal - substrate interaction, Gibbs - Wulff - Kaischew theorem, Gibbs - Thomson equation, kinetics of nucleation, 3D phase formationon UPD modified foreign substrate surfaces, Transition between UPD and OPD etc. are illustrated. In the fifth chapter titled **Growth of crystalline phases,** preparation of single crystal faces bt electrodeposition, growth kinetics of perfect crystal faces as well as real crystal faces etc. are discussed. In the sixth chapter titled **Metal deposits and surface structuring & modifications,** several other physico - chemical properties of the deposited metals such as texture, epitaxy & morphology, metal deposition by pulse techniques, laser introduced deposition methods, formation of ultrathin metal films and surface structuring & modifications are reviewed. Chapters seven through ten encompass materials such as references, abbreviations & symbols and some appendices.

Overall, the book is well written with clear illustrations of figures and an easy understandable style. This book deserves place among books related to electrochemistry and metallurgy.

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