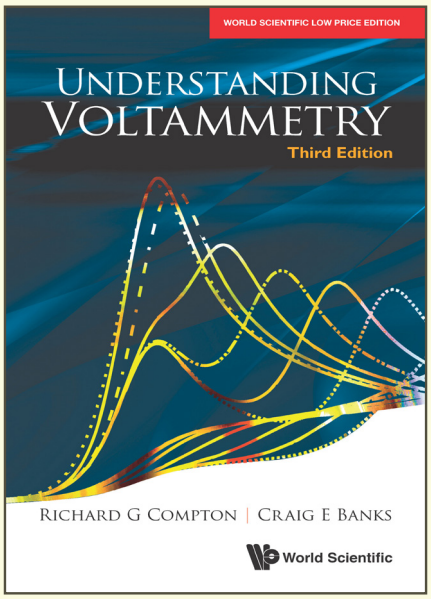
Understanding Voltammetry
3rd Edition



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ABOUT THE BOOK

The power of electrochemical measurements in respect of thermodynamics, kinetics and analysis is widely recognised but the subject can be unpredictable to the novice even if they have a strong physical and chemical background, especially if they wish to pursue quantitative measurements. Accordingly, some significant experiments are perhaps wisely never attempted while the literature is sadly replete with flawed attempts at rigorous voltammetry.

This textbook considers how to implement designing, explaining and interpreting experiments centered on various forms of voltammetry (cyclic, microelectrode, hydrodynamic, etc.). The reader is assumed to have knowledge of physical chemistry equivalent to Master's level but no exposure to electrochemistry in general, or voltammetry in particular. While the book is designed to stand alone, references to important research papers are given to provide an introductory entry into the literature.

The third edition contains new material relating to electron transfer theory, experimental requirements, scanning electrochemical microscopy, adsorption, electroanalysis and nanoelectrochemistry.

READERSHIP

Researchers and professionals in electrochemistry, batteries, fuel cells, solar cells, analytical chemistry.

CONTENTS

- Voltammetry at Heterogeneous Surfaces
- Cyclic Voltammetry: Coupled Homogeneous Kinetics and Adsorption
- Hydrodynamic Electrodes
- Voltammetry for Electroanalysis
- Voltammetry in Weakly Supported Media: Migration and Other Effects
- Voltammetry at the Nanoscale
- Appendix: Simulation of Electrode Processes

ABOUT THE AUTHORS

Richard G Compton is Professor of Chemistry and Aldrichian Praelector at Oxford University, United Kingdom where he is also Tutor in Chemistry at St. John's College. Compton is a Member of the Academia Europea and has broad interests in both fundamental and applied electrochemistry and electroanalysis including nanochemical aspects. He is the Physical Chemistry Editor of the Oxford Chemistry Primers series which comprises about 100 short texts covering a wide range of essential topics in the undergraduate chemistry curriculum. He has published more than 1500 papers (h = 96; Web of Science, February 2018) and holds numerous patents. He has been Chinese Academy of Sciences Visiting Professor at the Institute of Physical Sciences, Hefei and is a Lifelong Honorary Professor at Sichuan University. He holds Honorary Doctorates from the Estonian Agricultural University (now the Estonian University of Life Sciences) and Kharkov National University of Radioelectronics (Ukraine) and is a Fellow of the RSC and of the ISE. He is also a Fellow of the International Union of Pure and Applied Chemistry and a Thomson Reuters Highly Cited Researcher from 2014 to 2017 (see http://highlycited.com/).

Craig Banks holds a Personal Chair at Manchester Metropolitan University, Manchester UK in electrochemical and nanotechnology and researches the electrochemical properties of 2D materials, including graphite and graphene, and has pioneered new screenprinting methods for electrodes used in chemical analysis. This work has applications ranging from batteries to clinical diagnostics and is described in over 400 publications. Craig is named inventor on 18 patent families. Craig's work is highly cited and his h-index is 60 and he has published four books and 20 book chapters. Craig is lifelong an Honorary Professor at Central South University, China. Craig has spun out two companies from his research and was awarded the Royal Society of Chemistry's Harrison-Meldola Memorial Prize (2011) for his contributions to the understanding of carbon materials, in particular, graphene and its application as an electrode material.