



Understanding Voltammetry: Problems and Solutions

By Richard Guy Compton

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The field of electrochemical measurement, with respect to 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 book presents problems and worked solutions for a wide range of theoretical and experimental subjects in the field of voltammetry. The reader is assumed to have knowledge up to a Master's level of physical chemistry, but no exposure to electrochemistry in general, or voltammetry in particular, is required. The problems included range in difficulty from senior undergraduate to research level, and develop important practical approaches in voltammetry.

The problems presented in the earlier chapters focus on the fundamental theories of thermodynamics, electron transfer and diffusion. Voltammetric experiments and their analysis are then considered, including extensive problems on both macroelectrode and microelectrode voltammetry. Convection, hydrodynamic electrodes, homogeneous kinetics, adsorption and electroanalytical applications are discussed in the later chapters, as well as problems on two rapidly developing fields of voltammetry: weakly supported media and nanoscale electrodes.

There is huge interest in the experimental procedure of voltammetry at present, and yet no dedicated question and answer book with exclusive voltammetric focus exists, in spite of the inherent challenges of the subject. This book aims to fill that niche.

Readership: Senior undergraduates, graduates and researchers interested or specialising in electrochemistry and especially, voltammetry.

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Editorial Review

Review

"This is a very good book on voltammetric techniques. It presents a correct and deep discussion of all important issues in this field. Several ideas, theories, and experimental procedures are described with refreshing clarity. Its unique structure based on selected problems and their solutions helps the reader understand the topics covered. It is also an excellent textbook, which is worth studying carefully by newcomers and experienced electrochemists alike. Can be recommended to graduate students, teachers, and researchers, i.e., to everybody who studies, teaches, or applies voltammetric techniques. This book is a helpful addition to the library of colleagues using voltammetry or the library of any university where courses in electrochemistry are offered." -- Analytical and Bioanalytical, Chemistry

"The presentation of the relevant theory through real cases is undoubtedly one of the main characteristics, which makes this book of real interest, particularly for students but also to more experienced scientists ... Although this volume is a complement to the textbook cited above, it can stand alone and may become one of those books that you keep returning to." -- Chemistry World

From the Inside Flap

The power of electrochemical measurements in respect of thermodynamics, kinetics and analysis is widely recognized 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 book presents problems and worked solutions for a wide range of theoretical and experimental subjects in the field of voltammetry. The reader is assumed to have knowledge up to a Masters level of physical chemistry but no exposure to electrochemistry in general, or voltammetry in particular. The problems included range in difficulty from senior undergraduate to research level, and develop important practical approaches in voltammetry.

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There is huge interest in the experimental procedure of voltammetry at present, and yet no dedicated question and answer (worked examples) book with exclusive voltammetric focus exists, in spite of the inherent challenges of the subject. This book provides instruction via problems and worked solutions from fundamental theory up to advanced applications and recent developments.

About the Author

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 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 1300 papers (h = 82; Web of Science, February 2015) and hold 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 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. He is the Founding Editor and Editor-in-Chief of the journal Electrochemistry Communications.

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