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BOOK REVIEW

A first course in electrode processes, 2nd edition

D. Pletcher, University of Southampton, Royal Society of Chemistry, 2009, ISBN: 978-1-84755-893-0; Paperback; 316 pages, Price: £39.99

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This book provides a very good introduction to newcomers in the field of electrochemistry. It starts with the fundamentals in chapter 1 and continues with descriptions of the two sides of the interface at which electrochemical reactions take place, the electrode and the electrolyte, in chapter 2. Chapter 3 then describes this interface and the electrochemical double layer. With these three chapters as a basis, the student is ready to consider theory on the actual electrode reactions treated in chapters 4 and 5. Most of the theory in this first part of the book is classical electrochemistry that was also given in the first edition of this book but is now rewritten and updated with, for example, comments on electron transfer within biomolecules. Chapter 6 on experimental electrochemistry is new and practically oriented, with useful tips for laboratory work. This chapter links well to chapter 7 on techniques for the study of electrochemical reactions. This is the most extensive chapter; it focuses on non-steady state techniques as potential step and cyclic voltammetry. Chapters 8 and 9 are both new and give the reader an insight into application areas for electrochemistry, including energy (fuel cells) and techniques for improving the environment—these are both important research fields now and in the future. They serve as good practical examples, inspiring the reader to find out more about applied electrochemistry. The book ends with 26 problems for the reader to work on; solutions are provided.

It is clear that the author is a very experienced teacher having the ambition to make students really understand the subject. Each chapter starts with an introduction to put the theory to be treated in a larger context, referring to both earlier and coming chapters. Some chapters also end with a summary or concluding remark to further link between the different parts of the book and help the student to structure the material. Rather complex theory, as that of electron transfer, is explained in words and pictures rather than by equations to facilitate understanding. The problems given in the end of the book are very good and many of them are based on experimental data that require some calculations in order to be interpreted. The reader is asked not only to do the calculations but also to comment and reflect on the results with questions as "suggest a mechanism for the reduction of 4-bromonitrobenzene and additional experiments that could be used to confirm the mechanism". Answers are given at the end of the chapter. This way of encouraging thinking about the practical use of the basic electrochemistry is also very useful to improved understanding. Many important areas of electrochemistry are only briefly described, leaving the reader to explore the literature and this is, of course, necessary considering the limited number of pages.

One thing I particularly like about this book is the way of generously sharing useful practical tips and advice. The new chapter 6 contains many examples, for example how to choose a reference electrode for a particular system, how to minimize electrical noise and some useful cell designs in studies of electrode reactions. The importance of controlling parameters such as temperature and mass transport is pointed out and exemplified and the necessity of understanding the raw experimental data before making any analysis with advanced software is also stressed. Chapter 7 has a section entitled "The Approach to the Study of a New System" with useful guidelines of how cyclic voltammetry

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can be used in initial studies of new electrochemistry, followed by an illustrative example.

This book explains basic theory well using a limited number of equations, combined with practical tips and well designed problems to reflect on. The book provides an excellent starting point for a new research worker in the field of electrochemistry.