



### Book Reviews

Milan Paunovic and Mordechai Schlesinger,  
**Fundamentals of Electrochemical Deposition.**  
*John Wiley & Sons: New York (1998). 301 pages,  
£45–50*

The number of texts solely devoted to electrodeposition as a science (and a technology) are far too few and a good up to date tome in this area is therefore welcome. This book joins an impressive Electrochemical Society Series, which is listed at the front. It is interesting to note that *Modern Electroplating* (third edition) by Frederick Lowenheim is also contained in this list. Obviously this new book is in very fine company!

The authors have put together a volume encompassing a very wide range of electrodeposition material. They commence in the early chapters with basic electrochemistry, covering water and ionic solutions, metals and metal surfaces as well as the metal-solution interphase, electrode potentials and the kinetics and mechanism of electrodeposition. It could be argued that this information could easily be found elsewhere and in greater depth; however, the reviewer does not hold with this opinion as the inclusion of this material produces a fuller approach to the science of electrodeposition and allows this text book to be more 'self-contained'.

Further chapters cover the very important areas of nucleation and growth in electrodeposition as well as electroless and displacement deposition, each chapter giving an adequate amount of information and also an excellent list of references and further reading. Later chapters include the effect of additives, electrodeposition of alloys and some very much up to date information on in-situ characterisation of deposition, mathematical modelling of electrochemistry as well as a more broad approach to characterising metal surfaces and thin films. Finally, to bring the book right up to date, there are chapters on electrodeposited multilayers and interdiffusion in thin films.

So what are the reviewer's final thoughts on this volume? It is a theoretical book in many ways (this is not a criticism) and doesn't carry detailed applied information that, say, Lowenheim's book does. What it does succeed in doing is packing an awful amount of information into one volume, increase that information with a reference and further reading lists at the end of each chapter and you have a really good text. It is the kind of book you can use as a first 'port of call' when examining a new subject area. The reading lists guide you further into the subject and enable the beginning of a more indepth search. In conclusion, 'Fundamentals of Electrochemical Deposition' by Paunovic and Schlesinger should be an important addition to the bookshelf of the advanced researcher as well as important reference to both undergraduate and postgraduate course

students who have this subject area as part of their course.

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Jürgen O. Besenhard,  
**Handbook of Battery Materials.**  
*Wiley-VCH (1999), ISBN 3-527-29469-4,  
618 pages £210*

As the author states in the Preface, the use of batteries continues to rise as more consumer products (such as mobile phones and portable PCs) and industrial developments (including battery- and fuel cell assisted vehicles) rely upon electrochemical power sources.

This book aims to fill a gap between books on the (electro)chemistry of batteries and the many texts on the specialised properties of batteries. While the book appears long (over 600 pages) the treatment is, in fact, concise and it is easy to find information on a particular cell or material. I was pleased to see a comprehensive index provided at the end of the book.

The book is divided into sections on Fundamental and General Aspects of Electrochemical Power Sources, Materials for Aqueous Electrolytic Batteries and Materials for Alkali Metal Batteries. There are 23 contributions from over 40 international authors. The handbook focuses on batteries; fuel cells are not considered although several of the contributions provide information on materials used in such devices.

The first part of the text concisely deals with thermodynamics, kinetic performance, practical batteries and the global competition between primary and secondary batteries. The remainder of the book provides specific contributions on particular types of cell or electrode material. I have particularly appreciated the contributions on "Carbons" by K. Kinoshita and on "Solid Electrolytes" by P. Birke and W. Weppner, the latter being illustrated by several colour drawings to show the crystallographic structure of key conductive solids.

A diverse amount of material is presented in the form of, e.g., chemical reactions, line drawings, tables of performance data and photographs. While there is some inconsistency in the format of graphical plots, readers should find the presentation to be clear and easy to interpret.

This handbook convinces the reader of the overriding importance of materials properties in the construction of batteries and their resultant performance. It is also very important to be aware of diverse power systems when developing novel batteries and fuel cell devices.