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BOOK REVIEW

C.G. Vayenas, R.E. White, M.E. Gamboa-Adelco (eds): Modern aspects of electrochemistry vol. 41

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As the most recent volume of a successful series established 1954 and carefully continued this book provides a timely collection of four review papers covering widely distributed aspects of electrochemistry in representative contributions. In continuation of a contribution published in Vol. 38 of this series (not in Vol. 39 as claimed by the editors) J. Maier reviews devices and techniques in solid state electrochemistry. The omnipresence of sensors in exhaust systems of internal combustion engines used to control the optimum conversion of fuel and suppression of pollutant formation would be a sufficient justification of this chapter - but there are already more applications around, and even more are in the pipeline - just think of numerous other sensors, solid oxide fuel cells or of the (less fortunate) sodium/sulfur battery. These subjects: sensors, energy storage and conversion systems are treated from the scientists point of view. This section is no substitute for a currently missing handbook on the current state of the art of primary and secondary batteries. In the second part of this contribution numerous purely electrical experimental techniques - which tend to be substantially different from those employed with liquid electrolytes - are treated in detail. Mathematical aspects are condensed in several appendices dedicated to selected methods.

Carbon is probably the most versatile electron-conducting material in electrochemistry. Surprisingly still new modifications and forms appear. Essentially all types of porous carbons are the subject of the chapter provided by Lee and Pyun, the term nanoporous remains undefined - and seems to be a tribute to the nano rage. Preparation, characterization, structural characteristics derived from gas adsorption methods, methods for structural investigation and finally the application in electrochemical double layer capacitors EDLC are treated extensively in separate sections.

The use of graphs in the study and description of reaction mechanisms at electrode interfaces is described by J.D. Fehribach in a rather short contribution. These graphical displays of reaction mechanisms, reaction species and reaction routes are rather popular in particular with complicated mechanisms. Most figures are taken from previous publications, unfortunately their quality is considerably below the average encountered elsewhere in this book, in some cases this makes for hard reading.

In the final, fourth contribution Scott and Sun review approximate analytical solutions for models of three-dimensional electrodes by Adomian's decomposition method. Porous electrodes and particulate materials as employed e.g. in packed bed electrodes are treated with this approach. Numerous examples of comparisons between calculated values and results of experimental investigations illustrate the potential of this approach which - as argued by the authors - is considerably faster than conventional numerical methods.

The book is carefully prepared, fortunately the quality of figures (with some mentioned exceptions) has improved considerably in comparison with previous volumes. Typing errors are rare, they will hardly confuse the reader. The book is a must for all libraries already owning previous volumes, in addition the contributions themselves justify acquisition for specialists entering the respective fields and subjects.

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