

NEWS

Book review

Electrochemical engineering-volumes I & II

I. Rousar, K. Micka and A. Kimla, Elsevier Chemical Engineering Monograph Volumes 21A & B, Elsevier, Amsterdam, 1985

Volume 1, 355 pp, \$77.75, Volume II, 337 pp, \$63.00 (\$140.75 for both volumes, ISBN 0-444-99562-2)

These two books on electrochemical engineering are part of a series of chemical engineering monographs and follow two earlier volumes on the same topic: Volume 9, *Electrochemical Reactor Design* – D. J. Pickett and Volume 18, *Principles of Electrochemical Reactor Analysis* – T. Z. Fahidy. Aimed primarily at postgraduate students of inorganic or electrochemical technology and industrial electrochemical engineers, the books cover mathematical and practical aspects of electrochemical engineering and are based on material from Professor Rousar's lectures. Unfortunately, other than in the mathematical appendices, references to the literature cease at 1980. SI units and IUPAC conventions are used where possible.

The three parts in Volume I cover:

- (1) heat and mass transport phenomena in dilute and concentrated electrolyte solutions,
- (2) current density distribution in electrolyzers with electrode processes controlled by charge transfer,
- (3) transport phenomena at plate electrodes and diaphragms.

Volume II continues with a discussion of transport phenomena in electrolyzers, and concludes with a section on porous flow-through, packed and fluidised bed electrodes.

The distinctive approach of the books is in their considerable reliance on the use of computer-based numerical methods for solution of those electrochemical engineering problems which are too complex for analytical solution, e.g. developing mathematical descriptions of the concomitant transfer of charge, mass and heat in electrochemical reactors. Although the authors claim that a knowledge of electrochemistry, mathematics and computer programming "to an extent usual in university courses is assumed", they presuppose a level of mathematical ability which UK graduate chemical engineers would not normally possess. To some extent anticipating this shortfall, the authors provide extensive appendices to Volume II, covering: ionic mobilities, basic mathematical equations of hydrodynamics, equations relating to finite difference methods, basic equations of vector analysis in various coordinates, and finite element and boundary element methods. However, no computer code listings are given for example problems.

These two volumes bring together material which is widely dispersed, and for some topics, hitherto available only in journals. The treatment of current and potential distributions in electrochemical systems is particularly impressive and the most comprehensive presently available. However, neither of these volumes is for the mathematically faint-hearted.

The books are a timely and valuable contribution to the subject, and are highly recommended.

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