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# BOOK REVIEWS

*Self-Diffusion in Electrolyte Solutions.* A Critical Examination of Data compiled, edited by R. MILLS, Atomic and Molecular Physics Laboratories, Research School of Physical Sciences, The Australian National University, Canberra, ACT, Australia, and V.M.M. LOBO, Department of Chemistry, University of Coimbra, Coimbra, Portugal. Physical Sciences Data, 36; Elsevier Science Publishers, Amsterdam 1989, 354 pages, price:US $ 134.25/Dfl.275.00, ISBN 0-444-87288-4.

The compilation, the first of this kind, fills a major gap in the electrolyte data. Virtually, all the data on self-diffusion in electrolyte solutions reported elsewhere has been examined. The book contains over 400 tables covering diffusion of ions in binary and ternary aqueous solutions, in mixed solvents and non-electrolytes in various solvents. An important feature of the compilation is that all the data has been critically examined and its accuracy assessed. The other worth noting parts of the book are as follows: 1) an introduction in which the methods of measurements are reviewed, 2) appendices containing tables of the limiting self-diffusion coefficients of ions, 3) a list of references to data which has been omitted because of the lack of information on the diffusing system.

This is the only complete compilation of data on self-diffusion in electrolyte solutions. The book is addressed to electrochemists in general, since application of recent developments in the theory of transport processes requires these data. It can also be useful to electroanalytical chemists as the ionic self-diffusion coefficient is an important quantity for the interpretation of electrode reactions. In addition, the book can be interesting for geochemists and environmental chemists, because migration of radioactive ions from the nuclear waste to certain aqueous media is governered by the tracer diffusion coefficient.

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*Environmental Models: Emissions and Consequences,* edited by J. FENHANN, H. LARSEN, G. A. MACKENZIE and B. RASMUSSEN, Riso National Laboratory, Systems Analysis Department, Roskilde, Denmark; Elsevier, Amsterdam–Oxford–New York–Tokyo, 1990; 500 pages, US $ 100.00/Dfl 195.00, ISBN 0-44-88609-5.

The development of a comprehensive computer model allowing us to predict in detail the consequence of emissions from power stations and other industrial activities is not yet possible. Nevertheless, it is important to link the calculations of emmission and emmission reduction measures with the environmental consequences.

The most important value of modelling is a possibility to define links between components of very complex environmental systems.

The book is based on the Riso International Conference *Environmental Models: Emissions and Consequences,* and it deals with the following topics:

emission from the plants producing and converting energy and undertaking other industrial activities,
environmental, physical, biological and economical consequences of emissions,
implications of emission reduction measures.

In the chapter *Emissions,* a set of papers focused on evaluation of emissions through Europe is published.

It is of great importance to find a way of collecting suitable data on national emission rates on an European level.Thus, there is need to develop method of calculating national emission rates of $SO_2$, $NO_x$ and VOC. The following procedure has been proposed: An international central office, taking care that all relevant activities be considered, collects the statistical data at the national institution disposal. They are asked to check the data and to add the corresponding emission factors. Thus, the basic data sets become official. As the international statistics used are published on an annual basis, the emission calculations can be updated regularly. So topical results will be available every year.

The significant shortcoming of proposed solutions is that all actions are concentrated on Western Europe. One should recognize that any activity in protection of the environment makes sense only if it leads to improvement of its quality. To my mind, it is impossible to reach significant improvement in air quality by looking only into a part of a continent. There is need and time to form a basis for a global European environmental policy.

The second interesting chapter of the book deals with *Economics.*

The problem of the greenhouse effect is well known. The recommendation of the Toronto Conference of 1988 is an overall reduction of $CO_2$ by 2005. This reduction should be allocated between the industry and consumption sector. It seems to be the most expensive measures. Therefore, it is of great importance to have a tool allowing us to perform analysis of cost-effectiveness. The paper *Cost considerations on $CO_2$ abatement* of that chapter is an initial step in looking into the problem.

In the case of $SO_2$ emission, it is of great importance to evaluate in economic terms cost of damage caused by acid rains. It would help to optimize action. From this standpoint the paper *Some macroeconomic consequences of emissions to air* by GLOMSTROD should be considered as an important contribution.

Chapter IV *Emission and short-range effects* deals with models allowing us to assess air quality in local scale. The following items are discussed:

an application of a mass consistent model (NOABL) to build tridimensional wind field for area of Genoa,
air pollution information system tool for desk top air pollution management on a local scale.

Chapter V *Biological effects* deals with assessment of possible effects of climatic change on crop production, plant growth and yield, and health damage caused by technological emissions.

Chapter VI *Energy and environmental planning* is concentrated on strategies of reduction of a negative effect of energy production. The efforts to prevent air pollution made so far in Japan and their implications are reviewed first, and then appropriate methods to reduce the $SO_x$ and $NO_x$ emissions for the future are studied together with the utilization of fuels and energy technologies. In the review of current efforts, (1) the present state emissions and also costs and effects of emission control are summarized and (2) the necessity and effectiveness of emission control are discussed based on epidemiological threshold of concentrations of air pollutants against physical and botanical damages. In the study of counter measures for the future (3), future utilization of fuels and transportation devices in transportation sector are analyzed under the tradeoff relationships of system cost and environmental emission by employing the energy system optimization model MARKAL, and (4) effects of emission reduction are evaluated in terms of population dose defined as $NO_2$ concentration multiplied by population.

Chapter VII *Aquatic systems* is devoted to defining threats to water coming from production facilities. There are two important issues discussed in that chapter: a general model for heavy metal pollution of aquatic ecosystems and disposal of residues from electricity production. It is demonstrated how it is possible to set up a heavy metal model for an aquatic ecosystem in general. It does not imply that the same model can be applied to every case study. It is necessary to modify it in each case. However, in each of the 5 submodels presented, the variations are minor, while the major question is which submodel should be selected for a particular case. The submodels are: a distribution model, a model of metal speciation, a model for release of metal from sediment, a model related to the metal concentrations in biota and an effect model. It is discussed which components should be compared in each submodel and therefore what modifications are expected in different cases.

Chapter VIII *Terrestrial systems* deals with models reducing the effect of air pollution on soil and biota.

Finally, chapter IX *Integrated models* focusses on evaluation of models, especially on characteristics of uncertainties.

As all books written by many authors, this one is not uniform either. Therefore, the reader can find some different attempts to cover wide range of important issues. On the other hand, there are papers which cover very specific topics and which can be of interest only to a few readers.

Nevertheless, the book offers new and abundant information, and therefore be interesting for people working on different aspects of „air environment", especially those looking into impact of energy production on the environment.

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*Effluent treatment and waste disposal,* edited by D. HANDLEY, Papers from a symposium organized by the Institution of Chemical Engineers (Yorkshire Branch), Leeds, 28–30 March, 1990, Symposium Series No. 116, Hemisphere Publishing Corporation, Taylor a. Francis, Falmer Press, International Scientific and Educational Publishers, London 1990, ix+402 pages, price: Ł 34.50, ISBN 0-85295251-1.

Proceedings of a three-day symposium organised by the Institution of Chemical Engineers and held at the University of Leeds (28–30 March, 1990) contained 30 papers on treatment, monitoring, economics and disposal of wastewater as well as on progress in the field. Authors and participants from many countries took part it the conference.

The papers deal with practical aspects of wastewater and sludge disposal and their utilization, as well as process design criteria. The papers on various methods of biological wastewater treatment, including biorecovery of metals and biodegradation of azo-dye, dominate. Much attention was also paid to electrochemical treatment of wastewater and other industrial wastewater treatment.

The paper on "microbial options for the treatment of gaseous, liquid and solid wastes" discusses the potentiality for developmentof microbial alternatives to conventional physical and chemical processes applied in pollution control. In other papers there were presented novel solutions to old problems.

Two keynotes on *Effluent Treatment and Waste Management and the Role of the National Rivers Authority in Pollution Control* have given a philosophical and practical approach to the pollution control.

The book should be on the shelves of all libraries of institutions and individuals involved in pollution control. The students and scientists will find in the book some examples of good scientific work.

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