BOOKS

Thermodynamics: Fundamentals, Applications, Otto Redlich, Elsevier, Amsterdam, 77 pages, $38.50

This is a book in the best tradition of physical chemistry. It is designed for the chemist and chemical engineer but also for the physicist, electrical and mechanical engineer, and biochemist. It will have a special appeal so some chemical engineers.

From an author rich in years and in significant contributions to the field, we expect a body of mellowed and defined knowledge that may not necessarily be an up to the minute account of latest developments. We are not disappointed. Most of the book shakes delightful reading. The whole spectrum from fundamentals to applications is covered in a broad sweep peppered with penetrating remarks and observations.

Unfortunately it is just not possible to do justice to all the topics in two hundred and some pages, especially when such a large variety of topics are included. The precise language helped in economizing space, but important deviations are skimped in a number of places.

Special attention is paid to rigor and generality in the presentation of the principles of classical thermodynamics. The concepts of generalized coordinates and generalized forces are introduced at the outset. Caratheodory's viewpoint is adopted in the development of the laws of thermodynamics. In contrast the presentation of statistical principles is highly heuristic.

Generally high quality is maintained in the discussion of the topics that are included. Chemical engineers will find the chapters on solutions and phase equilibria of solutions of particu-

lar interest. The chapter on electrolyte solutions can be recommended to those seeking a lucid introduction to this area of considerable complexity and current interest. Chemical reactions are only briefly discussed, but the examples all taken from industrial systems are excellent.

The last chapter deals with a variety of phenomena: surfaces, centrifugation, electrostatics magnetostatics, and radiation.

Even with the inclusion of such a great variety of topics, we nevertheless find missing some that are dear to many chemical engineers, e.g., principle of corresponding states, high pressure fluid phase equilibria, gas solubility, etc.

This is an advanced book of considerable sophistication. I would not recommend it to the beginners, but would most certainly do so to the specialists.

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Introduction to Engineering Thermodynamics, H. F. Silver and J. E. Nydahl, West Publishing Co., St. Paul, Minnesota (1977). 557 pages. $15.95.

This book is addressed to the beginning student of thermodynamics. The treatment is strictly classical macroscopic thermodynamics. The coverage of the text is consistent with most contemporary chemical engineering thermodynamics texts. The authors emphasize the balance approach and we find mass balances, momentum balances, the first and the second laws developed by this means. They feel that this leads to a more unified approach and that does seem reasonable. Each chapter of the book contains numerous worked

examples. They are presented in great detail and should be very helpful to a student of the subject.

The authors have introduced entropy from macroscopic considerations. They do not introduce sections on quantum physics, statistics and probabilities as a consequence. As most recent texts do use the statistical approach, it is refreshing to see a new book that does not play "follow the leader". No mention of the Caratheodory development of the second law is made. This is somewhat disappointing as in many respects, I find the adiabatic inaccessibility statement to be the most satisfying method of introducing the second law.

The amount of material presented could be covered in two semesters of study. The volume of material devoted to Thermodynamics of Heat Engines in Chapter 7 seems to be a bit too extensive. I would like to have seen more attention devoted to multi-phase simultaneous chemically reacting systems, for example.

The objectives presented at the beginning of each chapter should be an aid to the student. While they are not written in the very detailed format that some educators advocate, they should provide guidance for the learner.

On the whole, the book is free from concept or typographical errors. The authors did get a little careless in their treatment of partial molar properties for binary mixtures as they introduce terms such as $(\partial V_M/\partial x_2)_{P,T,x_1}$ which, of course, is mathematically not possible.

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