

We have chosen these for familiarity and because they are (perhaps fortuitously) successful examples of the application of fundamentals introduced earlier in the course. We believe that unit operations should be taught this way when possible: from personal experience and in the light of available theory.

Plans for Future Development

It is obvious from this discussion that our course outline is too long, and each year we must slight some topics very badly to obtain meaningful coverage of others. We believe we must soon either expand to a one-year sequence or move much of Section I to a new course on the estimation of physical properties.

We particularly feel the need of more examples, both for consolidating the theory presented and for advertising new fields. We also feel that we are placing too little emphasis on inventiveness and ingenuity. This course is therefore far from satisfactory, even in its philosophy. We hope it will look very different five years from now.

BIBLIOGRAPHY

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ChE book reviews

Kinetics of Chemical Processes

Michel Boudart,

Prentice-Hall (1968), ix+246 pp.

To quote from the jacket of this volume ". . . Chemical kinetics, once the esoteric domain of the theorist, has become a vital tool in the design, operation and control of reactors . . .". With the emergence over the past decade of chemical reaction engineering as an active and vital area in both teaching and research, the need for a book such as that Professor Boudart has provided us with here has become almost painful. To be sure, chemical engineering kinetics (whatever that is) is said to be the topic treated in a number of available texts. Kinetics, however, generally seems to bow out of the picture after quick tours through phenomenological rate forms,

chain reactions and the steadystate approximation, numerous integrated rate equations and the inevitable Langmuir-Hinshelwood discussion. One is left in these texts with a substantial involvement in reactor analysis and design, which is certainly worthwhile, but kinetics then appear only as something taken for granted. Those who have attempted teaching reaction kinetics as distinct from reactor analysis or reaction engineering, know that the assembly of material for such a course at any level other than the trivial is a tiresome task of searching through a number (in my own case, six) of texts and monographs in the chemical and chemical engineering literature. No longer! In this admirable introductory text, Professor Boudart has put all the information together for us, clearly and concisely, while still leaving lots of latitude for us all to incorporate our own variations.

The approach of the book is straightforwardly put in the Preface: to develop the single chapter on kinetics in a physical chemistry text into a whole course, giving the essence of theory and experiment without indulging in extreme chemical detail. The contents include introductory material on rate functions and reactor types, theory of chemical kinetics of elementary steps, steady state treatments for various systems, chain reaction sequences, the concept of rate determining steps and stoichiometric numbers, irreducible (i.e., those arising from the reaction process itself) transport effects on kinetics, and correlation methods for both homogeneous and heterogeneous reactions. There are a number of points which demonstrate how well structured and carefully written this text is. For example, transition state theory is developed via the thermodynamic formulation, which very clearly distinguishes between energy and entropy contributions to reaction rates. The development given for reactions proceeding via elementary steps involving active centers — chain and catalytic sequences — provides a useful generalization for a large portion of kinetics, and the chapters on correlations in homogeneous and heterogeneous reaction kinetics provide a nice amalgam of information from sources which are diverse and perhaps not the most familiar. There are quite a number of problems included, and they are generally excellent. In short, this is a book which every chemical engineer should have in his library.

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