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Book Review

J. A. BIESENBERGER and D. H. SEBASTIAN: Principles of Polymerization Engineering, Wiley, New York, 1983, 744 pp., 75.50 Canadian dollars.

The book is intended to serve those who are in touch with processes aimed at the manufacture of high polymers; it emphasizes concepts and principles, and as the authors mention in the Preface, "The goal is the formulation of generalizations that will be useful in the design, scaling and modification of polymerization processes."

The first chapter, entitled "Fundamentals," gives the reader comprehensive data on reactor dynamics and reaction path, reactor types, process output, efficiency and selectivity, the concept of relative dispersion, some polymer properties affected by reaction path, polymerization types, stoichiometry and constraint equations, equilibrium and rate constants, random polymerization, addition polymerization, some kinetic approximations, copolymerization, and instantaneous properties.

The second chapter, "Reaction Phenomena," deals with the basic degree of polymerization characteristics, the most probable degree of polymerization distribution, the Poisson distribution, the transition from step to chain addition, the Gaussian copolymer composition distribution, statistical effects, chain-transfer effects, cumulative distributions, and chemical similarity.

"Mixing Effects" is the title of the third chapter which discusses goodness of mixing, residence time distribution, mixing and chemical reaction, effect on reactor performance, and effect on product properties.

"Thermal Effects" is the subject of the fourth chapter. Here the authors present the effect of isothermal temperature level, optimal temperature policies, thermal runaway, effect on product properties, thermal instability, and multiple steady states.

The fifth chapter, "Flow Phenomena," deals with reactive processing, reaction viscosity, continuous externally pressurized reactors, and continuous drag-flow reactors.

The last chapter, entitled "Polymer Devolatilization," deals with equilibrium theory, rate theory, continuous process models, batch process models, and equipment theory.

To help the reader, the volume also contains the following seven appendixes: Polymerization chemistry, distributions, mathematical methods, thermodynamics, chemical kinetics, transport theory, and characteristic times and dimensionless groups.

This excellent book is presented at a high scientific level, with a lot of mathematical considerations and very comprehensive tables of data and diagrams. It is addressed primarily to the industrial engineer or scientist in research or development with a sound technical background in polymerization processes.

D. Feldman