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A review of: “Structure and Mechanism in Vinyl Polymerization”

George E. Ham^a

^a Geigy Chemical Corporation, Ardsley, New York

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BOOK REVIEW

“Structure and Mechanism in Vinyl Polymerization”

Structure and Mechanism in Vinyl Polymerization (540 pages) edited by Teiji Tsuruta and Kenneth F. O'Driscoll and published by Marcel Dekker, New York and London, 1969, will be read with considerable interest by the many friends and acquaintances of the editors. The association of these two men with complementary interests and with bases in two hemispheres has produced an unusual and remarkable book. There is no doubt that much new insight is offered by this book which has not been found previously in books written in the English language on the chemistry of high polymers.

The lead off chapter on historical development of the theory of the reactivity of vinyl monomers by Professor M. Imoto of Osaka is one of the better recent attempts to place in perspective the pioneering contributions of Staudinger, Schulz, Flory, Melville, Price, Tobolsky, Hopff, Norrish, Alfrey, Mayo, Sakurada, Walling, and others.

The second chapter on structure and reactivity of vinyl monomers by Teiji Tsuruta organizes monomers by structure and in relationship to reactivity. Professor Tsuruta draws a variety of meaningful conclusions about the effects of steric, resonance, and polar factors on the behavior of monomers in polymerization. A brief but excellent treatment of theoretical considerations relating to energy factors is given. A table of monomer reactivity ratios and Q-e values of alpha substituted methyl acrylates is included.

Chapter 3 on initiation in free radical polymerization by O'Driscoll and Ghosh reviews the classical theories relating to initiation. Cage effects in initiator decomposition and chain termination by initiator are treated, for example. The general categories of free radical initiators by chemical class are given and individual mechanisms, particularly those involving metals, are discussed.

The remaining chapters have been carefully selected and are well done. It is difficult to pick for comment an individual chapter over others because of their uniformly good quality. Perhaps, attention should be drawn to Professor Otsu's chapter on heterogeneous metal peroxides. As far as I know, for the first time this intriguing new method of steric regulation of free radical polymerizations has been summarized in a book chapter. The chapter by J. Smid on elementary

steps in anionic vinyl polymerization and that of Ketley and Fisher on molecular rearrangements in vinyl polymerization also should be noted.

I reluctantly call attention to some errors such as "N-vinyl pyridine" on page 539 and the rather frequent misspellings of the names of authors in references, especially in chapters by Japanese authors. Several instances of repetition of subject matter were noted from chapter to chapter, the most noticeable being that of the description of the participation of sulfur dioxide in free radical polymerization which occurs on pages 91 to 94 in the O'Driscoll and Ghosh chapter and on pages 209 and 210 of Minoura's chapter.

The editors, in spite of the shortcomings mentioned, are to be congratulated for their courage in attempting and their success in carrying out the objectives of this book.

George E. Ham

*Geigy Chemical Corporation
Ardsley, New York*