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Crystallographers

J. Appl. Cryst. (1985). **18**, 53

This section is intended to be a series of short paragraphs dealing with the activities of crystallographers, such as their changes of position, promotions, assumption of significant new duties, honours, etc. Items for inclusion, subject to the approval of the Editorial Board, should be sent to the Executive Secretary of the International Union of Crystallography (J. N. King, International Union of Crystallography, 5 Abbey Square, Chester CH1 2HU, England).

Winfred O. Milligan died 18 February 1984 in Houston, Texas. Born in Coulterville, Illinois on 5 November 1908, he earned his PhD at Rice University in 1934. For the past 19 years he was Distinguished Research Professor of Chemistry and Physics at Baylor University in Waco, Texas. He was Director of Research at the Robert A. Welch Foundation, Houston from 1955, shortly after its inception, until his retirement in 1982. Professor Hugo Steinfink writes that the Foundation emerged, under his leadership, as the foremost private granting agency in the support of basic research in chemistry in the USA. Professor Milligan's research interests were in X-ray and electron diffraction, electron microscopy, gas absorption and magnetic properties. He made fundamental contributions to the structures of lanthanide and actinide hydrous oxides and hydroxides. He was a fellow or member of, and held offices in, numerous professional societies. He was a charter member of the American Society for X-Ray and Electron Diffraction and a member of its successor society, the American Crystallographic Association.

Book Reviews

Works intended for notice in this column should be sent direct to the Book-Review Editor (J. H. Robertson, School of Chemistry, University of Leeds, Leeds LS9 9JT, England) As far as practicable books will be reviewed in a country different from that of publication.

J. Appl. Cryst. (1985). **18**, 53–54

Structure of crystalline polymers. Edited by *I. H. Hall*. Pp. 313. London: Elsevier Applied Science Publishers, 1984. Price £35.00.

This is an interesting collection of review papers on the subject of crystalline polymers, focusing mainly on measurements of the shape of molecular chains. There are seven chapters in this volume, which are written by researchers whose approach to the subject matter is that of the experimental physicists, *i.e.* they are concerned with the use of experimental techniques that would discriminate between various competing theoretical models. With this rigorous approach, the conformations of the macromolecular chains are examined on the scale of a few angstroms and then increased to the level of organization that is visible in the optical microscope, *i.e.* morphological scale of a few micrometers.

The first chapter is written by R. D. B. Fraser, E. Suzuki & T. P. MacRae on *Computer analysis of X-ray diffraction patterns*. This paper is concerned with the use of a digital computer to interpret wide-angle X-ray scattering (WAXS) data. Using raster-scanning digital microdensitometers, the diffracted intensity can be measured at every point on a fine lattice superimposed on the photograph and the information stored in a computer. Methods of analyzing this immense amount of data with particular reference to silk fibers are discussed. This chapter is written with sufficient introductory material that those who may not be directly involved in the same area of research can benefit through its elegant style of presentation.

The second chapter is by I. H. Hall on *The determination of the structures of aromatic polyesters from their wide-angle X-ray diffraction patterns*. This contribution is concerned with the experimental WAXS study of chain conformation in polyesters such as poly(ethylene terephthalate) and poly(butylene terephthalate). A tremendous amount of unit-cell information for a series of polyesters, quite invaluable to polymer scientists, is discussed and critically reviewed. Through his clear style of writing, the author covers areas of his investigation that may involve dangers of misinterpretation and uncertainties of data that can still haunt X-ray diffraction studies.

The third chapter is by E. L. Thomas on *Transmission electron microscopy of polymers*. Electron microscopy investigations have provided much of the detailed information on polymer morphology. This chapter outlines the key techniques and the theoretical basis for interpreting images derived from either conventional TEM or scanning transmission electron microscopy (STEM). The usefulness and limitations of the various techniques are documented based on the polymer literature. The author surveys many aspects of polymer science issues, which include the 'nodule controversy in amorphous polymer glasses' and defects in polymer crystals such as screw dislocations in polyethylene. Covering 124 papers up to 1983, the reader will find it quite rewarding to go through this review, which discusses pertinent issues of polymer microscopy.

The fourth chapter is written by D. M. Sadler on *Neutron scattering by crystalline polymers: molecular conformations and their interpretation*. This manuscript attempts to answer two basic questions in polymer science, namely, what are the shapes of macromolecules inside their crystal lattice and how do the crystals form that shape? Judging from the beautiful presentation in this chapter, neutron scattering has already made remarkable progress in answering the first if not the second of these questions. Small-angle neutron scattering (SANS) data obtained from the Institut Laue-Langevin in Grenoble are discussed for materials including deuterated polyethylene, isotactic polypropylene, isotactic polystyrene and poly(ethylene oxide), even though only the work on polyethylene is discussed in detail. Also, the effects of annealing are covered only briefly and the chapter is selective in order to give special attention to the interpretation of conformations relating to the mechanisms of crystallization. Effects of orientation on the shape of the macromolecules are also covered elegantly.

The fifth chapter is by I. H. Hall & M. Toy on *The ability of small-angle X-ray scattering (SAXS) to distinguish between morphological models of crystal*