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Tribute to Erhard W. Fischer

Erhard W. Fischer, born on February 16, 1929, studied Physics at the Technische Hochschule, Stuttgart, where he obtained his diploma and PhD degrees in 1954 and 1957, respectively. While his diploma thesis was in the field of metals, he was exposed to “high polymers” in his PhD thesis in studies on the improvement of arable soil by the addition of synthetic polymers.¹ From 1956 to 1962 he was Wissenschaftlicher Assistent at the Institut für Physikalische Chemie at the Johannes Gutenberg-Universität, Mainz, in the group of H. A. Stuart. He became interested in the fundamental physical properties of polymer materials, in particular, the crystallization and melting of macromolecules, the formation of polymer single crystals, the structures obtained by epitaxial and solid-state crystallization, and the morphology of oriented polymers, using electron and light microscopy, electron and X-ray scattering, and diffraction techniques as well as mechanical and calorimetric methods.² These studies, which included the role of chain folding in crystalline polymers, qualified him as a university lecturer (Habilitation). For a polymer scientist of today the folding of macromol-

ecules into lamellae appears obvious, yet for over 45 years, this was only a matter of speculation and was the focus of heated controversy.

After several years in the United States, both as a Research Fellow at the Research Triangle Institute in Durham, North Carolina, with Anton Peterlin and as an Associate Professor at the Polytechnic Institute of Brooklyn, New York, Fischer was appointed to a full professor position in Chemical Physics at the Institut für Physikalische Chemie at the Johannes Gutenberg-Universität, Mainz, where he remained from 1966 until 1983. During this time he spent extended stays as a visiting professor in the United States, Great Britain, and China. He was the founder and chairman of the Polymer Physics Section of the European Physical Society (1969–1975), chairman of the Polymer Physics Group of the Deutsche Physikalische Gesellschaft (1969–1973), and member of the Macromolecular Division of the IUPAC (1970–1975) and the Scientific Council of the Institute Laue-Langevin, Grenoble (1974–1978).

When the Max-Planck-Society decided in 1983 to establish a new institute for Polymer Research in

Mainz, Fischer and his former co-worker G. Wegner were selected as founding directors. Fischer later became the head of the Department of Polymer Physics. In organizing this Institute, the ground was set for him to realize his ideas of interdisciplinarity in the polymer field. Again, a concept that seems only logical to researchers today was radically counter to the prevailing view on how to perform research. Today, the Max-Planck Institut für Polymerforschung is recognized internationally for its excellence in polymer research, earmarked by strong interactions between the different departments, which include Polymer Physics, Synthesis, Solid State Chemistry, Spectroscopy, Theory, and Materials Science.

Fischer's research activities extend far beyond traditional polymer science. They have emphasized the role of structure and dynamics on the physical properties of polymers from the microscopic to the macroscopic scale, revealing the connections between behavior on vastly different length and time scales. Fischer has the uncanny ability to identify specific polymer effects and then to relate them to general concepts in condensed matter physics. His research activities included the use of a full complement of scattering methods (static X-ray, neutron, and light scattering as well as quasielastic and inelastic neutron scattering, photon correlation spectroscopy using X-rays and visible light, and Rayleigh-Brillouin spectroscopy), but also integrating many other techniques (e.g., X-ray and neutron reflectometry, optical ellipsometry, dielectric and mechanical relaxation spectroscopy, SQUID magnetometry, and calorimetry).

Some of his former and current research areas include the following: (i) chain conformations, order parameters, orientational correlations, and superstructures in solid and molten polymers as well as in mesophases;³ (ii) molecular and collective dynamics in various polymer systems (interdiffusion in polymer blends, collective hydrodynamic modes, dynamics in liquid crystalline polymers);⁴ (iii) the molecular basis of phase transitions (crystallization and melting, transitions in liquid crystalline polymers, mixing and demixing in polymer blends, microphase separation in block copolymers);⁵ (iv) physical properties of special polymer systems (stiff macromolecules, ferroelectric liquid crystals, block copolymers, polymers at surfaces and interfaces);⁶ (v) glass transition phenomena in polymers and in low molecular mass model compounds.⁷ He considers the last topic, which deals with a fundamental problem of solid-state physics, as his hobby since his retirement.

He has had numerous students and collaborators spanning experiment to theory and chemistry to physics. He is known as a person who places strong demands on his own scientific work as well as on that of his collaborators. He is always willing and, in fact, thrives on discussing science in great detail, drawing upon his in-depth knowledge of the literature and his command of the fundamentals of physics. His zeal in the pursuit of science often led him, an experimentalist at heart, to personally perform model calculations, develop theory, or devise new approaches to the treatment of scattering.

Fischer's scientific life proved to be extremely productive, documented by more than 270 papers where he is the author or coauthor, nearly 1000 papers by co-workers where his name does not appear explicitly but

where he made significant contributions, and more than 100 PhD and diploma theses that he supervised. In addition, many of his former co-workers are now directors at research institutes or full professors at different universities across the globe.

His scientific work was honored by the Fraser Price Memorial award of the University of Massachusetts (1978), the Polymer Physics Prize of the American Physical Society (1979), the election as a member of the Österreichische Akademie der Wissenschaften (1984), the French-German Alexander von Humboldt Award (1987), the Award of the Japanese Society of Polymer Science (1990), Fellowship in the American Physical Society (1998), Honorary Membership in the Japanese Society of Polymer Science (1998), and a honorary doctorate from the Universidad del Pais Vasco, Donostia (San Sebastian), Spain (2000).

Erhard W. Fischer had an enormous impact on the progress of polymer physics worldwide. He continues to be an invaluable partner for illuminating discussions and advice on any conceivable question in polymer physics. We join his colleagues around the world in wishing him all the best on his 75th birthday.

Note Added after ASAP Posting. This tribute was posted ASAP on 12/23/2003. Changes have been made to refs 2 and 7. The correct version was posted on 01/21/2004.

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