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5. Burton Carl Anderson

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Personalities in Polymer Science



Burton Carl Anderson

Honoring Dr. Burton C. Anderson on his 70th Birthday

Burt Anderson has played an important role in the progress of industrial chemical polymer research, has been a champion of inventiveness in research and of interaction between industry, academia and professional societies in the developing global environment.

Burton Carl Anderson was born on October 8, 1930 in Kewanee, Illinois, the son of Carl and Laura Williamson Anderson, their seventh child. He attended Webersfield Township Elementary and High schools in Kewanee, graduating in 1948 as Valedictorian.

Burt Anderson enrolled at the University of Illinois at Urbana, the leading teaching and research university in chemistry in the country at that time, to study organic chemistry. It was there that he became acquainted with Professor Carl Marvel, a relationship (as mentor, consultant and friend) that remained for over 40 years.

Anderson graduated from Illinois with an A.B. in chemistry in 1952 and was elected Phi Beta Kappa. He attended Massachusetts Institute of Technology for his graduate studies, developing a life-long love for organic chemistry. Under the guidance of Arthur C. Cope he completed his dissertation, "Synthesis of Cyclooctane Diols from *cis*-2,5-Diisobutylmethyl Tetrahydrofuran". After receiving his Ph.D. in 1955, he joined the Du Pont Company in Wilmington, Delaware in the Chemical Department at the

Experimental Station. In 1966, he moved to the Elastomer Chemicals Department, spent one year at the Beaumont Works in Texas, and returned in 1969 to the Experimental Station as Division Head for elastomer research. In 1972, he became Development Superintendent at the Chambers Works.

In 1974, Anderson returned to the Central Research and Development Department as Associate Director, Polymer Science and in 1979 became Director for Polymer Science. In 1981, he moved to the Finishes and Fabricated Products Department as Assistant Director of Research and Development and in 1985 became Technical Director, responsible for Specialty Products and Strategic Research in the same department.

In 1989, Anderson returned to the Central Research and Development Department, now as Associate Director and held this position until his retirement in 1994. During this period he managed the Center for Coatings Technology and specialized in early development of research leads.

Burt Anderson's research interests included synthesis, characterization and reactions of polymers, coordination, anionic and group transfer polymerizations, fluorine containing monomers and polymers, polymerization at extreme pressures, chemistry of organic coatings, and industrial development of research leads.

While manager at the Elastomer Chemicals Department, he was involved in the early development of Vamae[®], a medium performance elastomer. Recognizing that two excellent candidates, the alternating copolymer of ethylene and ethyl acrylate (with maleic acid monoethyl ester [MAME] as the cure site) and ethylene/acrylonitrile copolymers made at high pressure, were not commercially viable, Anderson began an effort which led to commercial Vamae[®], an ethylene/methyl acrylate/MAME terpolymer, which could be made in existing facilities.

In leadership of research programs which led to commercial products, Burt Anderson contributed to the development of fluorinated monomers which provided the carboxyl form of Nafion[®] and the nitrile-cured form of Kalrez[®] fluoroclastomer as well as to new catalysts for the polymerization of nylon.

Anderson also led several research activities which might be called "near misses" from the commercial point of view. These included elastomeric polypropylene, thermoplastic elastomers utilizing pivalolactone grafts on polymers, block polymers made by group transfer polymerization for contact lenses, and curing systems for poly(hexamethylenesulfone).

While a director at the Central Research and Development Department, Anderson was instrumental in recruiting a world-class group

working in polymer physical chemistry, bringing together excellent scientists who accomplished important and essential work on company products. Many of these people became research leaders on their own rights later in their careers.

Much of the polymer chemistry for automotive finishes was and is concerned with ingenious, yet practical, syntheses of acrylic co- and terpolymers. In the search for methods allowing better control than radical polymerization, Anderson led the development of an anionic polymerization system for methyl methacrylate which gave many of the desired structures but proved impractical. It was the recognition of the need for a more practical synthesis of these structures that led Owen Webster to discover Group Transfer Polymerization (GTP), a silicon compound-mediated living coordinative anionic polymerization which can provide many desired structures at room temperature and above. Under Anderson's leadership the chemistry of this polymerization was widely explored, providing many new structures and ultimately commercially useful copolymers.

In a significant effort parallel to the GTP program, Anderson led early research into the radical synthesis of acrylic oligomers and polymers using chain transfer chemistry mediated by organo cobalt compounds. This chemistry and technology has made vinyl-terminated, methyl methacrylate macromonomers useful for the preparation of branched acrylic polymers, commercially available.

During his career Anderson published 25 papers and is the holder of 15 patents. He served on the Editorial Boards of *Macromolecules*, the *Journal of Polymer Science*, (*Chemistry*), *Polymer*, and the *Journal of Macromolecular Science*, *Pure and Applied Chemistry*.

One of Burt Anderson's most striking contributions to the scientific and industrial community was his devotion to the development of people, matching chemists and assignments for specific research and professional jobs.

Representing Du Pont in activities of interest to the company, Anderson was active in the development of academic-industrial interactions. He was instrumental in the coordination of the industrial participants and a leading proponent of the Center of University of Massachusetts—Industry Research on Polymers (CUMIRP), the first formal academic-industrial cooperation on Polymers in the USA. He also represented Du Pont in the development of a polymer program at Howard University. Research results of interest to Du Pont resulted from interactions with the Commonwealth Scientific and Industrial Research Organization

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(CSIRO) in Melbourne, Australia and other chemical companies.

Burt Anderson was also active in the formation of the Pacific Polymer Federation, an organization which now encompasses 17 member organizations of the Pacific Rim. He was the Editor of the Preprints of the First Pacific Polymer Conference in Maui, Hawaii, and the Co-Editor of the First Pacific Polymer Federation Proceedings.

Anderson was also active in professional societies and served on numerous national and international committees. He was the Chairman of the Gordon Conference on Polymers in 1982. He served the Division of Polymer Chemistry of the American Chemical Society as Member at Large from 1987 to 1991, was elected Vice-Chairman in 1992, served as Chairman Elect in 1993 and Chairman in 1994. He was Co-Chairman of the third joint meeting of the ACS Division of Polymer Chemistry and the Macro Group UK Macromolecules 1991 in Canterbury, UK. He served on the evaluation panel of the National Institutes of Science and Standards 1985-1988.

Burt Anderson was a US National Representative to the IUPAC Macromolecular Division from 1984-1987, a Member of the Commission IV-2 and the Working Party on methyl methacrylate polymerization.

Burt pursues a number of outdoor hobbies. He is an avid fly fisherman of long standing, making his own flies including many of his own designs. He has fished for trout and salmon from his summer home in Maine, in many states of the Union and Canada, and especially enjoys exciting trips to Iceland. Watching the birds, a hobby learned from friend and mentor "Speed" Marvel, enriches these trips. Burt is also a dedicated waterfowl hunter and a number of his friends have enjoyed delicious duck and goose dinners, the successful culmination of the hunt.

In 1952, Anderson married Jean Kasten of Freeport, Illinois and they had three children: Jane, Sarah and Carl. Carl is now teaching philosophy at Reed College in Portland, Oregon. Jean died in a tragic automobile accident in 1988 and Burt now shares married life with Joan Kylan Anderson.

This article was prepared by **Otto Vogl**, Herman F. Mark Professor Emeritus, Department of Polymer Science and Engineering, University of Massachusetts, Amherst, MA 01003, USA.