



Preface

Professor Daryle H. Busch is one of the principal international authorities and innovators in the area of transition metal coordination chemistry. In particular, his contributions involving the preparation and use of synthetic macrocyclic ligands as specific agents in the binding of transition metals and in the control of transition metal reactivity are pioneering and scientifically remarkable.

This issue of *Coordination Chemistry Reviews* is designed to be a tribute to Daryle H. Busch, on the occasion of his 70th birthday. The contributions to this issue were solicited from friends, colleagues and former research associates of Professor Busch. The authors of the articles and reviews in this issue represent both the national and international chemistry community, especially the inorganic chemistry community. Through this special issue we acknowledge our gratitude and respect for the many aspects of Daryle H. Busch: scientist, colleague, leader, teacher, mentor, friend, and warm human being!

Kenneth J. Takeuchi



Vita: Daryle H. Busch

Daryle H. Busch is presently the Roy A. Roberts Distinguished Professor of Chemistry and his address is Department of Chemistry, The University of Kansas, Lawrence, KS 66045, USA; Tel.: +1 913 864 5172; Fax: +1 913 864 5747; e-mail: dbusch@eureka.chem.ukans.edu.

He was born on 30 March 1928 in Carterville, IL. In 1951 he was married to Geraldine Barnes and they have five children and eight grandchildren. Daryle received the B.A. in 1951 from Southern Illinois University with a Chemistry Major

and Mathematics and Physics Minors. He received the M.S. in 1952 at the University of Illinois, and his thesis title was "Studies in plating of cobalt and nickel from coordination compounds." In 1954, he completed the Ph.D., also at the University of Illinois, and with the thesis title "Stereochemistry of complex inorganic compounds". He proceeded directly to The Ohio State University, Department of Chemistry, in Columbus, OH, where he served from October 1954 to August 1988, advancing through the ranks to Professor in 1963. He was awarded a Presidential Professorship in 1987; and became Presidential Professor Emeritus in August 1988 when he departed from Ohio State to become the Roy A. Roberts Distinguished Professor in the Chemistry Department, University of Kansas, a position he still holds. Professor Busch has held Visiting Professorships at the University of Florida, University of California, Riverside, University of California, Los Angeles, and as a guest of the Japan Society for the Promotion of Science, at Kyushu University in Fukuoka, Japan.

At the present time, he is a consultant to Monsanto Company, Proctor and Gamble, Inc. and Praxair, Inc. He has previously consulted at the 3M Company, E.I. du Pont de Nemours and Co., Inc., Air Products and Chemicals, Inc., and Beaunit Fibers, and he has patents either in process or issued with six of these companies. He was a consultant to the USAF, Systems Development Command, and, long term, at the Savannah River Laboratory of DOE, and has served on the Chemistry Division Review Committee, Oakridge National Laboratory (chair, 1993 and 1995); Efficient Separations and Processing Program, DOE (ongoing); Chemistry Division Annual Review, Argonne National Laboratory (1993–5); and Brookhaven National Laboratory. He has also served NIH and NSF as a study section member; Allyn and Bacon, Inc. as consulting editor in chemistry; and as a consultant to the Chemical Abstracts Service. His service on editorial boards includes *Coordination Chemistry Reviews*; *Journal of Coordination Chemistry*; *Inorganic Synthesis* (editor, vol. XX); *Portugaliae Electrochimica Acta*; *Bulletin of the Korean Chemical Society*; *Journal of Inclusion Phenomena and Molecular Recognition*; *Supramolecular Chemistry*; *American Chemical Monograph Series*; *Chemical Reviews*; *Inorganic and Nuclear Chemistry Letters*; *Inorganic Chimica Acta*.

Persistently active in professional organizations, Busch served the American Chemical Society, as Chairman of the Division of Inorganic Chemistry in 1967; General Chairman, 3rd Regional Meeting, 1970; Chairman, Columbus Section, 1974; Councilor, Columbus Section, 1976–78, 1986–88; Chairman, University of Kansas Section, 1990–91; Committee on Science, 1991–; and as a candidate for President in 1996 and 1998. He dedicated long service to the International Union of Pure and Applied Chemistry (from 1978 to the present time), chairing the Commission on the Nomenclature of Inorganic Chemistry, 1986–89; presently, he is secretary of the Inorganic Chemistry Division Committee. He has also supported the American Association for the Advancement of Science, serving as the chair of the Chemistry Section in 1995. From 1989–93 he was Secretary–Treasurer of Inorganic Syntheses, Inc.

As a second year graduate student his research proposal won the first Bersworth Fellowship in Chelate Chemistry (1953, one fellowship granted nationwide), and a

few years after assuming his first academic post he received an Unrestricted Grant from the Research Corporation (1960). Professor Busch was recognized internationally by the Dwyer Medal in Coordination Chemistry, from the Chemical Society of New South Wales, Australia in 1978, and by the Izatt-Christensen Award in Macrocyclic Chemistry in 1994. In 1963, Busch received the American Chemical Society Award in Inorganic Chemistry sponsored by Texas Instruments Company, and, in 1976, the American Chemical Society Award for Distinguished Service in the Advancement of Inorganic Chemistry sponsored by Mallinckrodt Chemical Company. The Morley Medal of the Cleveland Section of the American Chemical Society was presented to Busch in 1975, and the ACS Columbus Section Award in 1978, and he became a Fellow of the American Association for the Advancement of Science, 1980. His Ph.D. institution awarded him the Bailar Medal in Coordination Chemistry in 1978. His undergraduate institution, Southern Illinois University, twice recognized his work, first with an Alumni Achievement Award in 1969 and then by election to their Hall of Fame in 1997. His first professional employer, The Ohio State University, recognized his teaching with an Alumni Teaching Award in 1980 and his research with a Senior Research Award in 1981; in 1982 he was asked to give the Commencement Address and in 1987 named one of the first two Presidential Professors. His current employer, the University of Kansas, recognized the teaching accomplishments of Professor Busch with the Louise Byrd Graduate Educator Award in 1997 and his research with the Olin Petefish Award for Research in Basic Science in 1994. In 1981-2, Professor Busch was a Guggenheim Fellow at the University of Colorado.

Professor Busch is author or coauthor of 350+ publications, most of which are research papers, but including over 50 book chapters and reviews, five books, and 10 patents (issued or in process).

The foundations of his research program are in transition metal coordination chemistry, including original synthesis, structure, reactions, and properties of new and unusual materials. The major part of the program is reasonably described as bioinorganic chemistry. Much of that research is also described by the phrase "supramolecular chemistry" and is concerned with the design, synthesis, and study of molecular systems having chambers specifically outfitted to facilitate certain chemical processes. In nature, the active site of an enzyme or the O_2 binding site of hemoglobin is such a chamber. This program's first success in this area was the design, synthesis, and characterization of the only family of totally synthetic, fully functional iron oxygen carriers. Present research is also concerned with the transition metal promoted reactions of O_2 and its reduction products H_2O_2 and HO_2 . Enzymes and potential applications have been the basis of these studies to date, and promising new catalysts have been developed and characterized. Among the target areas of this blend of inclusion chemistry and coordination chemistry are facilitated transport, molecular switching, electron transfer, and homogeneous catalysis, in addition to the modeling of enzymic and other biological processes. Present efforts also involve studies on facilitated transport, molecular materials having ferromagnetic coupling, materials based on orderly molecular entanglements, and unusual molecular species derived from chemical template reactions, most recently oligo-rotaxanes.