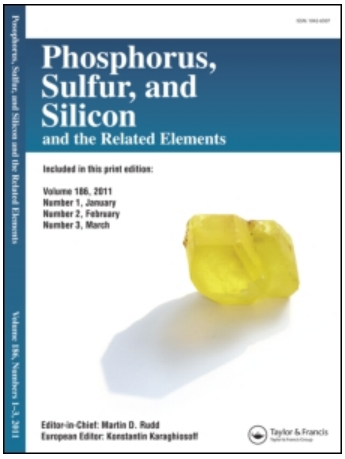

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PREFACE

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PREFACE

Professor John G. Verkade

It is with great pleasure that we honor Professor John G. Verkade with the dedication of this special issue of the journal to him on the occasion of his 60th birthday. John is a highly regarded scientist who has many outstanding contributions to synthetic chemistry, especially in the areas of main group and coordination chemistry.

Dr. Verkade was born in Chicago, Illinois in 1935. He received a B.S. degree with Honors at the University of Illinois in 1956, an A.M. at Harvard University, and a Ph.D. degree at the University of Illinois in 1960. John then assumed an Instructorship in the Chemistry Department at Iowa State University. By 1971, he had achieved the status of Full Professor, a position he presently holds there.

In addition to his scientific achievements, John has assumed a variety of posts in furthering the cause of teaching chemistry as well as vigorously supporting issues of importance to chemists in his numerous roles in the American Chemical Society. He has chaired many of their important committees and has served as an elected member of its Board of Directors. Many of us also know him for his excellent musical talent. At the request of the American Chemical Society, John opens each National ACS Council Meeting with a trumpet selection. He also has performed this function at many international meetings. He has four books to his credit, three of which were co-edited with our former Department Head, Louis Quin. He has over 280 publications, eleven patents, and has received numerous honors. John has been well funded over the years by the National Science Foundation and other organizations. His research, which has concentrated in the area of phosphorus chemistry, has provided him with an excellent national and international reputation. Many of his discoveries center on compounds with useful properties for applications in the biochemical area, as catalysts for making polymer stabilizers, as powerful bases for organic synthesis, and as vapor deposition agents for forming thin films.

Let us review some of his scientific advances. In 1958, while studying for the Ph.D. degree under Professor T. S. Piper at the University of Illinois, he proposed

the idea of using bicyclic $RC(CH_2O)_3P$ as a metal complexing agent. In subsequent work, this compound and its derivatives were found to have significant applications. For example, it is used as a starting material in the synthesis of phosphorus-based fire retardants currently sold by Borg-Warner chemicals, Albright and Wilson Americas, and Mobil Corporation. It is also used to stabilize a wide variety of organometallic and coordination complexes. The related compound, $RC(CH_2O)_3PZ$ (Z = O, S), exerts unusually potent biological effects on brain neuroreceptors. The *t*-butyl derivatives were subsequently sold by Amersham as radiolabels for brain research aimed at elucidating the constitution of the area of the brain believed to be responsible for epilepsy, Parkinsonism and Huntington's chorea.

Professor Verkade and his students were the first to define the conformation of Cytoxan, $(ClCH_2CH_2)_2N—P(O)[O(CH_2)_3NH]$, by crystallographic means and solution NMR studies. It is a widely used anti-tumor drug. His work on nickel complexes of $P(OR)_3$ ligands drew the attention of the DuPont Company in the early 70's that led to a consultancy. This interaction played an important role in the commercial development by DuPont of a zerovalent nickel-$P(OR)_3$ catalyst system for the hydrocyanation of butadiene in the improved synthesis of Nylon which is employed today.

More recently, Dr. Verkade and his coworkers have been studying the implications of their discovery that the bicyclic, $N(CH_2CH_2NMe)_3P$, is a more powerful base than any phosphine or amine known. This compound adds a hydrogen ion at the phosphorus atom and causes transannular P—N bonding to occur. It is a very efficient dehydrohalogenation and deprotonation agent in synthesis applications. For example, Dr. Verkade's group found that its use gives quantitative yields of pyrrol intermediates in the synthesis of porphyrins, and approximately doubles the overall yield of porphyrins. Strem Chemical Company and Digital Specialty Chemicals of Ontario Canada recently signed licensing agreements with Iowa State University for its manufacture and Strem lists it in its products catalog. It is also a powerful catalyst for the conversion of isocyanates to isocyanurates. The latter compounds are important stabilizers for commercially produced Nylon-6 and cyanurate-based plastics. This patented catalytic reaction resulted in signed confidentiality agreements between ISU and 18 companies in 1993–94.

Additional atrane chemistry has been forthcoming by his group incorporating a variety of main group and transition elements. Many of these compounds are volatile and can function as single-source chemical vapor deposition agents for pure films of M-nitrides. Such films have commercial applications including their use as improved light-emitting diodes, semiconductors and hard coatings.

In other recent work it was discovered that the simple commercially available compound PBu_3 efficiently removes sulfur from high-sulfur coals at relatively low temperatures in the presence of a metal catalyst or a proton source. This recently patented chemistry opens up an additional research area involving catalytic hydrodesulfurization of fossil fuels.

Among the awards received in recognition of his eminence in research are the BF Goodrich Award, an Alfred P. Sloan Research Fellowship, and the Mosher Award. In addition, he has held Visiting Professorships at MIT, the University of Indiana, and the University of Utah. He also is the Associate Editor covering the Western Hemisphere for our journal, *Phosphorus, Sulfur and Silicon and the Related Elements.*

Robert R. Holmes
Editor-in-Chief