Journal of Organometallic Chemistry, 365 (1989) 1–10
Elsevier Sequoia S.A., Lausanne – Printed in The Netherlands
JOM 09606A

Introduction

J.J. Zuckerman was born in South Philadelphia on February 29, 1936. He obtained a B.S. in 1957 at the University of Pennsylvania, where he worked under Professor A.G. MacDiarmid, an A.M. in 1959 and a Ph.D. in 1960, both from Harvard University under Professor E.G. Rochow. He received his second Ph.D. under Professor H.J. Emeléus, F.R.S., C.B.E., at Cambridge in 1962. From 1962 to 1968 he taught at Cornell University and then from 1968 to 1976 at the State University of New York at Albany, where he also served as Director for Research of the campus. In 1976 he moved to the University of Oklahoma to serve as Chairman of the Chemistry Department and remained there until his death on December 4, 1987.

In 1973 he was a Visiting Professor at the Technical University of Berlin Germany. In 1979 and 1982 he was Professeur Associé at the Université d'AixMarseille III, and was awarded a doctorate *honoris causa* from that institution in 1982. He was awarded an Sc.D. degree from the University of Cambridge in 1976, was elected a Fellow of the American Association for the Advancement of Science in 1981 and was made George Lynn Cross Research Professor at the University of Oklahoma in 1984.

Professor Zuckerman was the author of over 150 papers and numerous review articles on various aspects of the organometallic chemistry of the Group 14 elements, including their characterization by spectroscopic methods and tin-119m Mössbauer spectroscopy. His work was heavily supported by the National Science Foundation and the Office of Naval Research. He was Regional Editor of *Inorganic and Nuclear Chemistry Letters* (Pergamon Press), and the Editor of *Organotin Compounds: New Chemistry and Applications* (ACS Advances in Chemistry Series Volume, No. 157, 1976). With F.C. Nachod he co-edited *Determination of Organic Structures by Physical Methods* (Academic Press) and *Determination of Organometallic and Inorganic Structures by Physical Methods* (John Wiley) and prepared with Nachod the English Edition of *The Chemistry of Non-metals* by R. Steudel (W. de Gruyter). He wrote the article "*Molecular Structure*" for the 15th edition of *Encylopedia Britannica*. He was Managing Editor of the 18 volume series *Inorganic Reactions and Methods* (VCH), and co-author with I. Haiduc of *Basic Organometallic Chemistry* (W. de Gruyter).

His research spanned a variety of structural and electronic aspects of organometallic Group 14 compounds: the $(p–d)\pi$ bonding model, the structure of tin(II) derivatives and the stereoelectronics of their lone pairs, the determinants of the structure of organotin adducts, and substituent effects in aromatic tins. He was one of the early advocates of Mössbauer spectroscopy for the determination of structure in organotin derivatives and, toward the end of his career, his collaborative efforts made heavy use of X-ray crystallography.

As a teacher, Jerry combined his great love for the history of chemistry with his considerable organizational skills to give lectures that made him a popular and

effective teacher of General Chemistry, Organometallics, Inorganic, and Structural Techniques.

He was a strong proponent of an increased emphasis on descriptive chemistry and loved to spark a provocative discussion on this (and other) issues. His undergraduate, graduate, and postdoctoral researchers found that membership in the group required writing papers, reviewing manuscripts, presenting papers at ACS meetings, and leading discussions at weekly group meetings. These experiences, as well as numerous luncheons with editors and program directors, provided his students with a very valuable introduction to professionalism. His strong sense of tradition prompted him to develop his own professional family tree (see p. vii).

Sherry at the Zuckermans provided the opportunity to see a closely knit family that had shared in unusually wide-ranging travel adventures and to get to know friends and collaborators. All of his visiting guests were put up at the Zuckerman home and treated to receptions that quickly became departmental favorites. At these events his tremendous interests in history and foreign cultures, his enthusiasm for living, and his love of the profession became most obvious.

Professor Zuckerman will be sorely missed by his family, his students, his collaborators, his friends, and by the profession.

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J.J. Zuckerman — Publications

J.J. Zuckerman, The Reaction of Silicon with Dihydric Phenols: The Direct Synthesis of Silicon-Containing Heterocycles, *J. Chem. Soc.*, (1962) 873.

J.J. Zuckerman, The Reactions of Tin with Dihydric Phenols: The Direct Synthesis of Tin(II) Heterocycles, *J. Chem. Soc.*, (1963) 1322.

H.J. Emeleus and J.J. Zuckerman, Cyclic Esters of the Group IV Elements, *J. Organomet. Chem.*, 1 (1964) 328.

C.H. Yoder and J.J. Zuckerman, Spiro Silicon and Germanium Imidazolidines, *Inorg. Chem.*, 3 (1964) 1329.

J.J. Zuckerman, Direct Synthesis of Organosilicon Compounds, *Adv. Inorg. Chem. Radiochem.*, 6 (1964) 383.

G.T. Cocks and J.J. Zuckerman, The Synthesis of Tin(II) Heterocycles Directly from Stannous Oxide, *Inorg. Chem.*, 4 (1965) 592.

C.H. Yoder and J.J. Zuckerman, Silicon Imidazolidines, *Inorg. Chem.*, 4 (1965) 116.

J.J. Zuckerman, Crystal Field Splitting Diagrams, *J. Chem. Educ.*, 42 (1965) 315; 42, (1965) 668.

A.J. Bearden, H.S. Marsh and J.J. Zuckerman, Mössbauer Study of Tin(II)-Oxygen Heterocycles, *Inorg. Chem.*, 5 (1966) 1260.

E.W. Randall and J.J. Zuckerman, The Elusive ($p \rightarrow d$)-π Bond, *J. Chem. Soc., Chem. Commun.*, (1966) 732.

E.W. Randall, C.M. Silcox Yoder and J.J. Zuckerman, The Role of ν(C–N) as Evidence for the Mode of Binding of Amides to Lewis Acids, *Inorg. Chem.*, 6 (1966) 2240.

E.W. Randall, C.H. Yoder and J.J. Zuckerman, Explosive Tin–Nitrogen Systems, Inorg. *Nucl. Chem. Lett.*, 1 (1966) 105.

E.W. Randall, J.J. Ellner and J.J. Zuckerman, Group IV-Nitrogen Stretching Frequencies. An Unequivocal Assignment, *Inorg. Nucl. Chem. Lett.*, 1 (1966) 109.

E.W. Randall, J.J. Ellner and J.J. Zuckerman, ($p \rightarrow d$)-π Interactions in the Silicon-Nitrogen Bond. An Experimental Test, *J. Am. Chem. Soc.*, 88 (1966) 622.

C.M. Silcox and J.J. Zuckerman, Transformations of Heterocycles. The Conversion of Cyclic Esters of Silicon into their Phosphorus(III) and Phosphorus(V) Analogs in One Step, *J. Am. Chem. Soc.*, 88 (1966) 168.

C.M. Silcox and J.J. Zuckerman, Cyclic Esters of Silicon Containing a Six-Membered Ring: (1,8-Naphthalenedioxy)silanes, *J. Organomet. Chem.*, 5 (1966) 483.

D.L. Smith, M.H. Milford and J.J. Zuckerman, Mechanism for Intercalation of Kaolinite by Alkali Acetates, *Science*, 153 (1966) 741.

C.H. Yoder and J.J. Zuckerman, Transformations of Heterocycles. The Conversion of Silicon and Germanium Imidazolidines into their Phosphorus(V) Analogs in One Step, *J. Am. Chem. Soc.*, 88 (1966) 2170.

C.H. Yoder and J.J. Zuckerman, Amination and Transamination as Routes to Fourth Group Diamines, *J. Am. Chem. Soc.*, 88 (1966) 4831.

C.M. Yoder and J.J. Zuckerman, Infrared Spectra of Group IV *gem*-diamines, *Inorg. Chem.*, 5, 2055 (1966).

C.H. Yoder and J.J. Zuckerman, Group IV Imidazolidine Expansion-Contraction Reactions, *J. Chem. Soc., Chem. Commun.*, (1966) 649.

E.W. Randall, C.H. Yoder and J.J. Zuckerman, Nuclear Magnetic Resonance Studies of Exchange in Stannylamines, *J. Am. Chem. Soc.*, 89 (1967) 3438.

E.W. Randall, C.H. Yoder and J.J. Zuckerman, Proton Magnetic Resonance and Basicity Studies of Linear and Cyclic *gem*-Diamine Derivatives of Elements in Group IV. *Inorg. Chem.*, 6 (1967) 744.

C.M. Silcox Yoder and J.J. Zuckerman, Donor–Acceptor Complexes of Bis(*o*-phenylenedioxy)silane and Germane, *Inorg. Chem.*, 6 (1967) 163.

D.L. Smith and J.J. Zuckerman, Sn-119m Mössbauer Spectra of Tin-Containing Minerals, *J. Inorg. Nucl. Chem.*, 29 (1967) 1203.

C.H. Yoder and J.J. Zuckerman, Transmission of Substituent Effects through the N-Si-N System, *Inorg. Chem.*, 6 (1967) 103.

J.J. Zuckerman, Chemical Significance of Mössbauer Spectral Parameters. Sn-119m Isomer Shift and Percentage Ionic Character of Tin Bonds, *J. Inorg. Nucl. Chem.*, 29 (1967) 2191.

J.J. Zuckerman, Applications of Tin-119 Mössbauer Spectroscopy to Chemical Problems, *Mössbauer Effect Methodol.*, 3 (1967) 15.

N.W.G. Debye, E. Rosenberg and J.J. Zuckerman, Tin-119m Mössbauer Study of Five- and Six-Coordinated Organotin(IV) Ions, *J. Am. Chem. Soc.*, 90 (1968) 3234.

D.E. Fenton and J.J. Zuckerman, Nuclear Magnetic Resonance Chemical Shifts of the Acid Protons in Silyl-Substituted Benzoic Acids and Phenols and the Question of $(p \rightarrow d)$-π Interaction in the Silicon-Phenyl Bond, *Inorg. Chem.*, 7 (1968) 1323.

D.E. Fenton and J.J. Zuckerman, The Nature of the Tin-Transition Metal Bond, *J. Am. Chem. Soc.*, 90 (1968) 6226.

P.G. Harrison and J.J. Zuckerman, Addition and Substitution Reactions of Tin(II) Dimethoxide, *J. Chem. Soc., Chem. Commun.*, (1968) 321.

E.W. Randall and J.J. Zuckerman, Nuclear Magnetic Resonance and Infrared Studies of N-15-Substituted Trimethylsilyl-, germyl- and Stannylanilines. A Test of $(p \rightarrow d)$-π Bonding in Group IV-Nitrogen Bonds, *J. Am. Chem. Soc.*, 90 (1968) 3167.

J.G. Zavistoski and J.J. Zuckerman, Synthesis and Decomposition Reactions of a 7-Germanobornadiene, *J. Am. Chem. Soc.*, 90 (1968) 6612.

D.E. Fenton and J.J. Zuckerman, The Sn-119m Mössbauer Isomer Shift and the Valence State of Tin in Transition Metal Compounds, *Inorg. Chem.*, 8 (1969) 1771.

P.G. Harrison and J.J. Zuckerman, Sn-119m Mössbauer and NMR Study of Dicyclopentadienyl-tin(II), *J. Am. Chem. Soc.*, 91 (1969) 6885.

P.G. Harrison and J.J. Zuckerman, The Insertion of Phenyl Isocyanate into the Tin(II)–Oxygen Bond. The Tin(II)–Nitrogen Bond Through a Novel Heterocyclic Ring Expansion, *Inorg. Nucl. Lett.*, 34 (1969) 545.

J.G. Zavistoski and J.J. Zuckerman, Alkyltin Bond Cleavage–Cyclization by 1,4-Dilithio-1,2,2,4-tetraphenylbutadiene, *J. Org. Chem.*, 34, 4197 (1969).

B.F. Burnham and J.J. Zuckerman, Complex Formation Between Porphyrins and Metal Ions: Visible and Mössbauer Spectral Studies, *J. Am. Chem. Soc.*, 92 (1970) 1547.

D.E. Fenton, R.R. Gould, P.G. Harrison, T.B. Harvey, III, G.M. Omietanski, K.C-T. Sze and J.J. Zuckerman, The Esterification of Tin(II) Oxide, *Inorg. Chim. Acta*, 4 (1970) 235.

P.G. Harrison and J.J. Zuckerman, $(C_5H_5)_2Sn$: BF_3. The First Example of a Tin-Group III Complex, *J. Am. Chem. Soc.*, 92 (1970) 2577.

P.G. Harrison and J.J. Zuckerman, *O*-Trialkylstannyloximes, *Inorg. Chem.*, 9 (1970) 175.

P.G. Harrison and J.J. Zuckerman, Oxime Derivatives of Groups IV and V, *Inorg. Nucl. Chem. Lett.*, 6 (1970) 5.

T.P. Poeth, B.R. Willeford, T.V. Long, II, P.G. Harrison and J.J. Zuckerman, Some Metal Carbonyl Complexes of Tin-containing Arene Ligands. A Square Planar Ph_2SnMe_2 Moiety?, *Inorg. Nucl. Chem. Lett.*, 6 (1970) 527.

J.M. Wilson, A.G. Briggs, J.E. Sawbridge, P. Tickle and J.J. Zuckerman, Acid–Base Equilibria of Substituted Benzoic Acids. Part II. The Thermodynamic Parameters for Dissociation of t-Butyl and Trimethylsilyl-Substituted Acids. A Re-evaluation of the Results of the Chatt and Williams Experiment, *J. Chem. Soc., (A)*, (1970) 1024.

J.J. Zuckerman, Applications of Sn-119m Mössbauer Spectroscopy to the Study of Organometallic Compounds, *Adv. Organomet. Chem.*, 9 (1970) 21.

M.K. Das, P.G. Harrison and J.J. Zuckerman, Some Ring Expansion Reactions of Phosphorus and Boron Imidazolidines (1,3-Diaza-2-phospholidines and borolidines), *Inorg. Chem.*, 10 (1971) 1092.

M.K. Das and J.J. Zuckerman, Synthesis and Transformation of Phosphorus Imidazolidines (1,3-Diaza-2-Phospholidines), *Inorg. Chem.*, 10 (1971) 1028.

N.W.G. Debye, D.E. Fenton, S.E. Ulrich and J.J. Zuckerman, Sn-119m Mössbauer and Nmr Study of Trialkyltin Acetates, *J. Organomet. Chem.*, 28 (1971) 339.

P.G. Harrison, S.E. Ulrich and J.J. Zuckerman, Sn-119m Chemical Shifts by the Double Resonance of Organotin Compounds, *J. Am. Chem. Soc.*, 93 (1971) 5398.

P.G. Harrison, S.E. Ulrich and J.J. Zuckerman, NMR $J(^{31}P-^{1}H)$ and $(p \rightarrow d)$-π Interactions in Group IV Phenylphosphines, *J. Am. Chem. Soc.*, 93 (1971) 2307.

P.G. Harrison, J.J. Zuckerman and J.G. Noltes, Sn-119m Mössbauer Investigation of the Reaction of Dicyclopentadienyltin(II) with Phenylmagnesium Bromide, *J. Organomet. Chem.*, 31 (1971) C23.

P.G. Harrison, S.E. Ulrich and J.J. Zuckerman, The Relative Signs of the NMR Coupling Constants in Trimethylstannylphosphines, *Inorg. Nucl. Chem. Lett.*, 7 (1971) 865.

T.P. Poeth, P.G. Harrison, T.V. Long, II, B.R. Willeford and J.J. Zuckerman, Investigations of Some Tricarbonyl Metal Complexes of Tin-Substituted Ligands by NMR, Infrared, Laser-Raman, Sn-119m Mössbauer and Mass Spectroscopies, *Inorg. Chem.*, 10 (1971) 522.

E. Rosenberg and J.J. Zuckerman, The Synthesis of 2-Silanorcaranes, *J. Organomet. Chem.*, 33 (1971) 321.

C.H. Yoder and J.J. Zuckerman, Cyclic Compounds of the Fourth Group Elements, *Prep. Inorg. React.*, 6 (1971) 81.

N.W.G. Debye, D.E. Fenton and J.J. Zuckerman, Sn-119m Mössbauer and Infrared Study of Esters of Tin and Lead, *J. Inorg. Nucl. Chem.*, 34 (1972) 352.

N.W.G. Debye and J.J. Zuckerman, Mössbauer Spectra of Organometallics, in *Determination of Organic Structures by Physical Methods*, (ed. by F.C. Nachod and J.J. Zuckerman), Vol. 5, Academic Press, New York, 1972, p. 235.

P.G. Harrison, B.C. Lane and J.J. Zuckerman, Far Infrared and Sn-119m Mössbauer Study of Complexes of Phosphorus and Arsenic-Containing Ligands with Tin(IV) Halides, *Inorg. Chem.*, 1 (1972) 1537.

P.G. Harrison, S.E. Ulrich and J.J. Zuckerman, An NMR Investigation of the Bonding in Fourth Group Phenyl Phosphines, *Inorg. Chem.*, 11 (1972) 25.

F.C. Nachod and J.J. Zuckerman (Eds.), *Determination of Organic Structures by Physical Methods*, Academic Press, New York, Vol. 3, 1971; Vol. 4, 1971; Vol. 5, 1972.

J.K. Stalick, D.W. Meek, B.Y.K. Ho and J.J. Zuckerman, Sn-119m Mössbauer Parameters and Crystal Structure of the $SnCl_3^-$ Ion in Two Forms of Chlorobis[bis(1,2-diphenylphosphino)ethane]cobalt(II) Trichlorostannate(II), *J.Chem. Soc., Chem. Commun.*, (1972) 630.

J.J. Zuckerman, An Experiment in the Use of Texts in General Chemistry, *J. Chem. Educ.*, 49 (1972) 331.

J.J. Zuckerman, Synthesis and Properties of Germanium–Halogen and Germanium–Halogenoid Bonds, in *Organometallic Compounds of the Fourth Group Elements* (ed. by A.G. MacDiarmid), Marcel Dekker, New York, Vol. 1, Part 2, 1972, p. 1.

G.W. Grynkewich, B.Y.K. Ho, T.J. Marks, D.L. Tomaja and J.J. Zuckerman, Sn-119m Mössbauer and X-ray Photoelectron (ESCA) Studies of Tin Oxidation State and Bonding in Base·R_2Sn Pentacarbonylchromium and Tetracarbonyliron Complexes, *Inorg. Chem.*, 12, (1973) 2522.

B.Y.K. Ho and J.J. Zuckerman, Structural Organotin Chemistry, *J. Organomet. Chem.*, 49 (1973) 1.

B.Y.K. Ho and J.J. Zuckerman, Structural Variations in Trimethyl- and Tricyclohexyltin Derivatives of Amino Acids. Preference for Association by Nitrogen Bridging, *Inorg. Nucl. Chem. Lett.*, 9 (1973) 849.

B.Y.K. Ho and J.J. Zuckerman, Trialkyltin Derivatives of Amino Acids and Dipeptides, *Inorg. Chem.*, 12 (1973) 1552.

C.D. Schaeffer, Jr. and J.J. Zuckerman, Pulsed Fourier Transform NMR of Substituted Aryltrimethyltin Derivatives. I. NMR $J(Sn-^{13}C)$ Coupling Constants in Aryltrimethyltins, *J. Organomet. Chem.*, 47 (1973) C1.

J.C. Clardy, R.L. Kolpa, J.G. Verkade and J.J. Zuckerman, Crystal and Molecular Structure of 1,3-Bis(*para*-tolyl)-2-phenyl)-2-4,5-dihydro-1,3-diaza-2-phospholidine, *Phosphorus*, 4 (1974) 145.

M.K. Das and J.J. Zuckerman, Reactions of Some Unsaturated Compounds with 1,3-Diaza-2-Phospholidines and -Borolidines, *Curr. Sci.*, 43 (1974) 682.

B.Y.K. Ho, J.A. Zubieta and J.J. Zuckerman, X-Ray Crystal and Molecular Structure of Trimethyltin Glycinate, A Polymeric, Trigonal Bipyramidal Tin Compound, *J. Chem. Soc., Chem. Commun.*, (1974) 88.

C.D. Schaeffer, Jr., C.H. Yoder and J.J. Zuckerman, Carbon-13 Chemical Shifts of Substituted tert-Butylbenzenes, Phenyltrimethylsilanes and Phenyltrimethylgermanes, *J. Organomet. Chem.*, 80 (1974) 29.

C.D. Schaeffer, Jr. and J.J. Zuckerman, Pulsed Fourier Transform NMR of Substituted Aryltrimethyltin Derivatives. III. The Hammett σ-Constant of the Trimethyltin Group, *J. Organomet. Chem.*, 78 (1974) 373.

C.D. Schaeffer, Jr. and J.J. Zuckerman, Tin(II) Organosilylamines, *J. Am. Chem. Soc.*, 96 (1974) 7160.

J.J. Zuckerman and J.E. Zweig, "Rescheduling for Energy Conservation", Science, 184, (1974) 610.

M.E. Bishop, C.D. Schaeffer, Jr. and J.J. Zuckerman, Carbon-13 NMR Studies of Exchange in $R_3SnER'_n$ Derivatives, *J. Organomet. Chem.*, 101 (1975) C19.

B.Y.K. Ho and J.J. Zuckerman, Solid-State Association in Organotin Compounds Containing Bulky Organic Groups: Tricyclohexyltin Hydroxide, *J. Organomet. Chem.*, 96 (1975) 41.

H.J. Kroth, H. Schumann, H.G. Kuivila, C.D. Schaeffer, Jr. and J.J. Zuckerman, Sn-119m Chemical Shifts of *ortho-*, *meta-*, *para-*, 2,6- and Polysubstituted Aryltrimethyltin Derivatives and Related Organotin Compounds, *J. Am. Chem. Soc.*, 97 (1975) 1754.

W.Z. Min and J.J. Zuckerman, Lithium 1,1-Dicyclopentadienyl-1-bromo-2,3,4-tetraphenylstannole, A Five-Coordinated Tin(IV) Heterocycle with Pseudorotating Axial- and Equatorial-Fluxional, Monohapto-Cyclopentadienyl Groups in an $[R_4SnBr]^-$ Anion, *J. Am. Chem. Soc.*, 97 (1975) 2291.

C.D. Schaeffer, Jr. and J.J. Zuckerman, Pulsed Fourier Transform NMR of Substituted Aryltrimethyltin Derivatives. IV. Proton and Carbon-13 NMR Data for *ortho-*, 2,6- and Poly Substituted Aryltrimethyltins, *J. Organomet. Chem.*, 99 (1975) 407.

M.E. Bishop and J.J. Zuckerman, Trimethyltin Aziridine, an Associated Organotin Amine, *Inorg. Chim. Acta*, 19 (1976) L1.

M.E. Bishop, C.D. Schaeffer, Jr. and J.J. Zuckerman, Far Infrared and Raman Assignments of Substituted Aryltrimethyltins, *Spectrochim. Acta*, 32A, (1976) 1519.

M.K. Das and J.J. Zuckerman, Transmission of Substituent Effects Through N–E–N-Systems in Which E = C, Si, P(III), P(V) and B, *J. Chem. Soc., Chem. Commun.*, (1976) 460.

W.D. Honnick and J.J. Zuckerman, Tin(II) Hydroxide, *Inorg. Chem.*, 15 (1976) 3034.

W.D. Honnick, M.C. Hughes, C.D. Schaeffer, Jr. and J.J. Zuckerman, Tin-119m Mössbauer, Infrared, NMR, Equilibrium and Thermodynamic Measurements on Complexes of Dimethyltin Dichloride with Substituted 1,1-Phenanthrolines and 2,2′-Bipyridines, *Inorg. Chem.*, 15 (1976) 1391.

F.C. Nachod, E.W. Randall and J.J. Zuckerman (Eds.), *Determination of Organic Structures by Physical Methods*, Academic Press, New York, Vol. 6, 1976.

F.C. Nachod and J.J. Zuckerman (transl. eds.) Chemie der Nichtmetalle, Mit einer Einfuhrung in die Theorie der Atomstruktur und der chemischen Bindung, by R. Steudel; *Chemistry of the Non-Metals, with an Introduction to Atomic Structure and Chemical Bonding*, Walter de Gruyter, Berlin, 1976.

H. Schumann, W.-W. du Mont, H.J. Kroth, H. Neumann, P.J. Corvan and J.J. Zuckerman, Tin-119m Mössbauer Spectra of Trimethyltin Phosphines Used as Ligands in Transition Metal Carbonyl Complexes, *J. Organomet. Chem.*, 121 (1976) 321.

D.L. Tomaja and J.J. Zuckerman, On the Anomalous Properties of the η^1-Cyclopentadienyltin(IV) Halides, *Synth. React. Inorg. Metal-Org. Chem.*, 6 (1976) 323.

C.H. Yoder, F.K. Sheffy, R. Howell, R.E. Hess, L. Pacala, C.D. Schaeffer, Jr. and J.J. Zuckerman, Multiple Regression Analysis of Carbon-13 Chemical Shifts and Carbon-13 Proton Coupling Constants in *ortho*-Substituted Aromatics, *J. Org. Chem.*, 41 (1976) 1511.

J.J. Zuckerman (Ed.), Organotin Compounds: New Chemistry and Applications, Advances in Chemistry Series, No. 157, American Chemical Society, Washington, D.C., 1976.

M.E. Bishop and J.J. Zuckerman, *N*-Organotin Aziridines and Other Cyclic Amines and Their Adducts, *Inorg. Chem.*, 16 (1977) 1749.

M.K. Das and J.J. Zuckerman, Transmission of Substituent Effects Through N–E–N-Systems in Unsymmetrically N,N'-Substituted Heteroimidazolidines Where E = C, Si, P(V) and B, *J. Am. Chem. Soc.*, 99 (1977) 1254.

W.T. Hall and J.J. Zuckerman, Tin(II) and Dimethyltin(IV) Derivatives of Amino Acids, *Inorg. Chem.*, 16 (1977) 1239.

P.G. Harrison and J.J. Zuckerman, The Mössbauer Isomer Shift of Tin(II) Compounds, *Inorg. Chim. Acta*, 21 (1977) L2.

H. Schumann, W.-W. du Mont, E. Wöbke, P.J. Corvan and J.J. Zuckerman, Austauschreaktionen and Organostannylphosphinen: Identifizierung Einer Stabilen Zwischenstuffe, *J. Organomet. Chem.*, 128 (1977) 187.

S.D. Christian and J.J. Zuckerman, (Eds.), *Energy and the Chemical Sciences, The 1977 Karcher Symposium*, Pergamon Press, Oxford, 1978.

S.D. Christian, J.J. Zuckerman and L.J. Guggenberger (Eds.), *Proceedings of the Karcher Symposium on the Structural Aspects of Homogeneous, Heterogeneous and Biological Catalysis*, Trans. Am. Crystallogr. Assoc., (1978) 14.

W.D. Honnick and J.J. Zuckerman, Organotin(II)-Oxygen and Sulfur Heterocycles Through Protolysis of Tin(II) Methoxide, *Inorg. Chem.*, 17 (1978) 501.

C.D. Schaeffer, Jr., S.E. Ulrich and J.J. Zuckerman, On the Relationship Between the Sn-119m Mössbauer Isomer Shift and Nuclear Magnetic Resonance Parameters of Organotin Compounds: Extension of the May and and Spijkerman Model to C-13 NMR Measurements on Phenyltrimethyltins and to Higher Alkyltin Hydrides, *Inorg. Nucl. Chem. Lett.*, 14 (1978) 55.

J.A. Zubieta and J.J. Zuckerman, Structural Tin Chemistry, *Prog. Inorg. Chem.*, 24 (1978) 251.

J.J. Zuckerman, R.P. Reisdorf, H.V. Ellis, III and R.R. Wilkinson, Organotins in Biology and the Environment, in *Chemical Problems in the Environment: Occurrence and Fate of the Organoelements*, by J.M. Bellama and F.E. Brinckman (Eds.), ACS Symposium Series, No. 82, American Chemical Society, Washington, D.C., 1978, p. 388.

P.J. Corvan and J.J. Zuckerman, Colored and Colorless Tin(II) Amines, *Inorg. Chim. Acta*, 34 (1979) L255.

W.-W. du Mont, J.L. Lefferts and J.J. Zuckerman, Sn-119m-Mössbauer-Spektren von Funktionell Substituierten Stannylenen und Ihren Stannio-Komplexen mit Chrom-, Molybdän- und Wolfram-Carbonyl-Acceptoren, *J. Organomet. Chem.*, 166 (1979) 347.

W.D. Honnick and J.J. Zuckerman, Synthesis of Tin(IV)-Oxygen and Sulfur Heterocycles and Their Transformations to Tin(II) Analogues, *Inorg. Chem.*, 18 (1979) 1437.

W.D. Honnick and J.J. Zuckerman, Diorganotin Halide Carboxylates, Thiocarboxylates and Halide Haloacetates, *J. Organomet. Chem.*, 178 (1979) 133.

M.B. Hossain, J.L. Lefferts, K.C. Molloy, D. van der Helm and J.J. Zuckerman, The Crystal and Molecular Structure of Trimethyltin Chloride at 135 K. A Highly Volatile Organotin Polymer, *Inorg. Chim. Acta*, 36 (1979) L409.

K.C. Molloy, M.B. Hossain, D. van der Helm and J.J. Zuckerman, Oxy- and Thio-Phosphorus Acid Derivatives of Tin. II. The Crystal and Molecular Structure of O,O'-Diethyldithiophosphatotriphenyltin(IV) at 138 K. A Unique Monodentate Dithiophosphate Ligand, *Inorg. Chem.*, 18 (1979) 3507.

S.E. Ulrich and J.J. Zuckerman, Synthesis and NMR Study of Ethyl- and Perfluoroethyltin Vinyl and Hydride Derivatives, *Inorg. Chim. Acta*, 34 (1979) 161.

M.K. Das, M.R. Ghosh and J.J. Zuckerman, Mössbauer Studies on the Complexes of Tin(IV) with Some Monohydroxamic Acids, *Curr. Sci.*, 49 (1980) 428.

B.Y.K. Ho, K.C. Molloy, J.J. Zuckerman, F. Reidinger and J.A. Zubieta, The Crystal Structure and Variable Temperature Sn-119m Mössbauer Study of Trimethyltin Glycinate, A One-Dimensional, Amino-Bridged Polymer, *J. Organomet. Chem.*, 187 (1980) 212.

J.L. Lefferts, K.C. Molloy, J.J. Zuckerman, I. Haiduc, M. Curtui, C. Guta and D. Ruse, Oxy- and Thio-Phosphoric Acid Derivatives of Tin. IV. Diorganotin(IV) Bis-(dithiophosphate) Esters, *Inorg. Chem.*, 19 (1980) 2861.

J.L. Lefferts, K.C. Molloy, J.J. Zuckerman, I. Haiduc, C. Guta and D. Ruse, Oxy- and Thio-Phosphorus Acid Derivatives of Tin. I. Triorganotin(IV) Dithiophosphate Esters, *Inorg. Chem.*, 19 (1980) 1662.

J.L. Lefferts, M.B. Hossain, K.C. Molloy, D. van der Helm and J.J. Zuckerman, Phosphorsäure-Zinn-Derivate, 3, Röntgen-Strukturanalyse von Bis(*O,O'*-diphenyldithiophosphato)zinn(II), einem durch η^6-$C_6H_5Sn^{II}$-Wechselwirkungen zusammengehaltenen Dimer, *Angew. Chem.*, 92 (1980) 326; Oxy- and Thio-Phosphorus Acid Derivatives of Tin. II. The X-ray Crystal and Molecular Structure of Bis(*O,O'*-Diphenyldithiophosphato)tin(II), $Sn[S_2P(OC_6H_5)_2]_2$ a Bicylic Dimer Held Together by η^6-C_6H_5 to Tin(II) Interactions, *Angew. Chem., Int. Ed. Engl.*, 19 (1980) 309.

K.C. Molloy, J.J. Zuckerman, H. Schumann and G. Rodewald, Variable Temperature Sn-119m Mössbauer Study of Organotin-Substituted Styrene Monomers and Polymers, *Inorg. Chem.*, 19 (1980) 1809.

K.C. Molloy, M.B. Hossain, D. van der Helm, J.J. Zuckerman, and I. Haiduc, Oxy- and Thio-Phosphoric Acid Derivatives of Tin. V. The X-ray Crystal and Molecular Structure of Bis[*O,O'*-Diisopropyldithiophosphate]diphenyltin(IV), a Monomeric Molecular, Virtual Polymer, *Inorg. Chem.*, 19 (1980) 2041.

H. Schumann, G. Rodewald, V. Rodewald, J.L. Lefferts and J.J. Zuckerman, Diorganostyrlzinnchloride, *J. Organomet. Chem.*, 187 (1980) 305.

H. Schumann, G. Rodewald, J.L. Lefferts and J.J. Zuckerman, Diorganostrylzinndiorganophosphine and Ihre Tricarbonylnickelkomplexe, *J. Organomet. Chem.*, 190 (1980) 53.

G. Atkinson and J.J. Zuckerman (Eds.), *Proceedings of the Karcher Symposium on the Origin and Chemistry of Petroleum*, Pergamon Press, Oxford, 1981.

M.P. Bigwood, P.J. Corvan and J.J. Zuckerman, Synthesis of Stabilized Phenyltin(II) Compounds: Inhibition of the Conversion to Tin(IV) by Ortho-Substitution, *J. Am. Chem. Soc.*, 103 (1981) 7643.

G. Domazetis, B.D. James, K.C. Molloy and J.J. Zuckerman, Variable-Temperature Tin-119m Mössbauer Study of the Chlorodimethyltin(IV) Derivatives of L-Cysteine and DL-Penicillamine, *Inorg. Chim. Acta*, 54 (1981) L217.

T.S. Dory, J.J. Zuckerman, J.W. Connolly and C.D. Hoff, A. Reinvestigation of the Claim that Stannocene and (η^5-Cyclopentadienyltricarbonyltungsten Hydride Form Bis(η^5-cyclopentadienyltricarbonyltungsten)tin(II), *J. Chem. Soc., Chem. Commun.*, 521 (1981).

W.A. Gustavson and J.J. Zuckerman, A. Diglyme Adduct of Tin(IV) Chloride Formed on Drying Aromatic Solvents by the Benzophenone Ketyl/Potassium Metal Method, Synth., *React. Inorg. Metal-Org. Chem.*, 11 (1981) 47.

W.A. Gustavson, L.M. Principe, W.-Z. Min Rhee and J.J. Zuckerman, Synthesis of Tetraphenylstannacyclopentadienes (Stannoles). II. Derivatives and Adducts of 1,1-Dihalo-2,3,4,5-tetraphenylstannoles, *Inorg. Chem.*, 20 (1981) 3460.

W.A. Gustavson, L.M. Principe, W.-Z. Min Rhee and J.J. Zuckerman, Synthesis of Tetraphenylstannacyclopentadienes (Stannoles). I. Alkylation of 1,1-Dihalostannoles Leading to Lithium 1,1-Di-η^1-cyclopentadienyl-1-halo-2,3,4,5-tetraphenylstannole, an $[R_4SnX]^-$ Anion with Pseudorotating Axial- and Equatorial-Fluxional η^1-Cyclopentadienyl Groups, *J. Am. Chem. Soc.*, 103 (1981) 4126.

R.E. Karl and J.J. Zuckerman, Qualitative and Quantitative Analysis of Iron-Bearing Minerals in Fossil Fuels and Petroleum Source Rock by Fe-57 Mössbauer Spectroscopy, Mössbauer Spectroscopy and Its Chemical Applications, (ed. by G.K. Shenoy and J.G. Stevens), *Advances in Chemistry Series*, No. 194, American Chemical Society, Washington, D.C., 1981, p. 221.

K.C. Molloy, M.B. Hossain, D. van der Helm, J.J. Zuckerman and F.P. Mullins, Oxy- and Thio-Phosphorus Acid Derivatives of Tin. VI. The Crystal and Molecular Structures of Bis(dimethyldithiophosphinato)dimethyltin(IV) and Bis(diethyldithiophosphinato)diiodotin(IV) at 138 K, *Inorg. Chem.*, 20 (1981) 2172.

K.C. Molloy, M.B. Hossain, D. van der Helm, D. Cunningham, and J.J. Zuckerman, Oxy- and Thio-Phosphorus Acid Derivatives of Tin. VII. The Crystal and Molecular Structure of Phenylphosphonatotrimethyltin(IV) at 138 K. A Unique, One-dimensional, Helical $\{[(CH_3)_3Sn]^+[(C_6H_5(OH)P(O)OSn(CH_3)_3OP(O)(OH)C_6H_5]^-\}_n$ Polymer, *Inorg. Chem.*, 20 (1981) 2402.

W.-Z. Min Rhee and J.J. Zuckerman, Synthesis of Tetraphenylstannacyclopentadienes (Stannoles). III. Attempted Approach to the Parent Stannoles Through Closure of 1,4-Dichlorobuta-1,3-diene, *Synth. React. Inorg. Metal-Org. Chem.*, 11 (1981) 633.

U. Schubert, B.R. Willeford and J.J. Zuckerman, Crystal and Molecular Structure of η^6-η^6-Dimethyldiphenylstannanebis(tricarbonylchromium), $(CH_3)_2Sn[C_6H_5Cr(CO)_3]_2$, *J. Organomet. Chem.*, 215 (1981) 367.

D. Cunningham, L.A. Kelly, K.C. Molloy and J.J. Zuckerman, Oxy- and Thio-Phosphorus Acid Derivatives of Tin. XI. Synthesis and Properties of Di- and Tri-organotin(IV) Derivatives of Phenylphosphonic Acid *O*-Phenyl Ester, *Inorg. Chem.,* 21 (1982) 1416.

M.K. Das, J.W. Bibber and J.J. Zuckerman, Reactions of Tetrasulfur Tetranitride [Cyclotetra(azathiene)] with Some Tin(II) and Tin(IV) Compounds, *Inorg. Chem.,* 21 (1982) 2864.

J.L. Lefferts, K.C. Molloy, M.B. Hossain, D. van der Helm and J.J. Zuckerman, Oxy- and Thio-Phosphorus Acid Derivatives of Tin. VIII. The Tin(II) Bis(dithiophosphate) Esters of Bis[*O,O'*-Diphenyldithiophosphato]tin(II), A Bicyclic Dimer Held Together by Three-Coordinated Sulfur Atoms and by η^6-C_7H_5 Interactions Binding Tin(II) Lone Pairs to Phenoxy Ester Groups, *Inorg. Chem.,* 21 (1982) 1410.

J.L. Lefferts, K.C. Molloy, M.B. Hossain, D. van der Helm and J.J. Zuckerman, The Crystal and Molecular Structure of Trimethyltin(IV) Chloride, A Chlorine-Bridged, Linear Polymer, *J. Organomet. Chem.,* 240 (1982) 349.

K.C. Molloy, F.A.K. Nasser, C.L. Barnes, D. van der Helm and J.J. Zuckerman, Oxy- and Thio-phosphorus Acid Derivatives of Tin. X. The Crystal and Molecular Structure of Triphenyltin(IV) Diphenylphosphate, A Cyclic Hexamer, *Inorg. Chem.,* 21 (1982) 960.

K.C. Molloy, M.P. Bigwood, R.H. Herber and J.J. Zuckerman, Variable-Temperature Tin-119m Mössbauer Study of Tin(II) and Tin(IV) Amines, *Inorg. Chem.,* 21 (1982) 3709.

K.C. Molloy, F.A.K. Nasser and J.J. Zuckerman, Oxy- and Thio-Phosphorus Acid Derivatives of Tin. IX. Di- and Tri-organotin(IV) Diphenylphosphate Esters, *Inorg. Chem.,* 21 (1982) 1711.

S.B. Nagelberg, C.E. Reinhold, B.R. Willeford, K.C. Molloy and J.J. Zuckerman, Tricarbonylchromium Complexes of $(CH_3)_3EAr_2$ Ligands (E = C, Si, Ge, Sn and Pb; Ar = C_6H_5, $CH_2C_6H_4$ and para-$C_6H_4CH_3$), *Organometallics,* 1 (1982) 851.

S.-W. Ng and J.J. Zuckerman, The 1:1 Adducts of Dimethyltin(IV) Dichloride Forming Six-Coordinated Solids, *J. Chem. Soc., Chem. Commun.,* (1982) 475.

S.-W. Ng and J.J. Zuckerman, Synthesis of Triphenylphosphonopropionbetainetriorganotin(IV) Salts $[(C_6H_5)_3P(CH_2)_2CO_2SnR_3]^+ X^-$, by Nucleophilic Displacement of Anions from Triorganotins, *J. Organomet. Chem.,* 234 (1982) 257.

S.-W. Ng and J.J. Zuckerman, Di- and Tri-organotin(IV) Derivatives of Diphenylphosphinyl and diphenylthiophosphinylacetic Acid, *Organometallics,* 1 (1982) 714.

S.-W. Ng, C.L. Barnes, M.B. Hossain, D. van der Helm, J.J. Zuckerman and V.G. Kumar Das, The X-Ray Crystal and Molecular Structure of the 1:1 Dimethyltin(IV) Dichloride Adduct with Diphenylcyclopropenone, $(CH_3)_2SnCl_2 \cdot O{=}CC_2(C_6H_5)_2$ at 138 K, *J. Am. Chem. Soc.,* 104 (1982) 5339.

A.C. Sau, R.R. Holmes, K.C. Molloy and J.J. Zuckerman, Synthesis and Characterization of Novel Penta- and Hexacoordinated Sulfur-Containing Spirocyclic Tin(IV) Complexes, *Inorg. Chem.,* 21 (1982) 1421.

A. Saxena, J.P. Tandon, K. C. Molloy and J.J. Zuckerman, Tin(IV) Complexes of Tridentate Schiff Bases Having ONS Donor Systems, *Inorg. Chim. Acta,* 63 (1982) 71.

H. Schumann and J.J. Zuckerman, Omitted Data, *Science,* 216 (1982) 800.

J.J. Zuckerman, Shakespeare and Chemistry, *J. Chem. Educ.,* 59 (1982) 170.

B.P. Bachlas, H. Sharma, J.-Cl. Maire and J.J. Zuckerman, Novel β, γ-Triketonate Derivatives of Tin(II) and Tin(IV), *Inorg. Chim. Acta,* 71 (1983) 227.

J.W. Bibber, C.L. Barnes, D. van der Helm and J.J. Zuckerman, The Crystal and Molecular Structure of Bis(1,8-naphthalenedioxy)silane—A Contribution to the Controversy over Planar, Four-Coordinated Silicon in Orthosilicic Acid Ester, *Angew. Chem.,* 95 (1983) 498; *Angew. Chem., Int. Ed. Engl.,* 22 (1983) 501; *Angew. Chem. Suppl.,* (1983) 668.

D. Cunningham, P. Firtear, K.C. Molloy and J.J. Zuckerman, Oxy- and Thio-phosphorus Acid Derivative of Tin. XII. A Mössbauer Spectroscopic Investigation of the Structures and Polymorphic Behavior of Diorganotin(IV) Phenylphosphonates and Arsonates, *J. Chem. Soc., Dalton Trans.,* (1983) 1523.

M.K. Das, M. Nath and J.J. Zuckerman, Di- and Triorganotin(IV) Derivatives of *N,N*-Substituted Hydroxylamines, *Inorg. Chim. Acta,* 71 (1983) 49.

F.E. Hahn, T.S. Dory, C.L. Barnes, M.B. Hossain, D. van der Helm and J.J. Zuckerman, "The Crystal and Molecular Structure of *N*-Trimethylstannylsuccinimide at 138 K, an Associated, Helical Polymer, *Organometallics,* 2 (1983) 969.

K.C. Molloy and J.J. Zuckerman, Structural Organogermanium Chemistry, *Adv. Inorg. Chem. Radiochem.,* 27 (1983) 113.

K.C. Molloy and J.J. Zuckerman, Oxy and Thio Phosphorus Acid Derivatives of Tin. Structural Contrasts, *Acc. Chem. Res.*, 16 (1983) 386.

F.A.K. Nasser and J.J. Zuckerman, Oxy- and Thio-phosphorus Acid Derivatives of Tin. XIII. Di- and Triorganotin(IV) Di-*O,O*-organomonothiophosphate Esters, *J. Organomet. Chem.*, 244 (1983) 17.

F.A.K. Nasser, M.B. Hossain, D. van der Helm and J.J. Zuckerman, Oxy- and Thio-phosphorus Acid Derivatives of Tin. XIV. The Crystal and Molecular Structure of the Dimeric Di-*O,O*-phenylmonothiophosphatodiphenyltin(IV) Hydroxide, $[HO(C_6H_5)_2SnOP(S)(OC_6H_5)_2]_2$, *Inorg. Chem.*, 22 (1983) 3107.

S.-W. Ng, C.L. Barnes, D. van der Helm and J.J. Zuckerman, The Crystal and Molecular Structure of the Dimeric 1:1 Adduct of Dimethyltin(IV) Dichloride with 2,6-Dimethylpyridine *N*-Oxide at 138 K, *Organometallics*, 2 (1983) 600.

S.-W. Ng and J.J. Zuckerman, Di- and Tri-organotin(IV) Derivatives of 2-Benzoylbenzoic Acid, *J. Organomet. Chem.*, 249 (1983) 81.

M.M. Amini, A.L. Rheingold, R.W. Taylor and J.J. Zuckerman, A New Environment for Water. The First Authenticated Example of Water Molecules Engaged in Twin Three-Center Hydrogen Bonds. The Crystal and Molecular Structure of $\{[(CH_3)_2SnCl_2 \cdot H_2O]_2 \cdot 18\text{-crown-}6]\}_n$, *J. Am. Chem. Soc.*, 106 (1984) 7289.

T.S. Dory and J.J. Zuckerman, Stannocenophanes. Ring-Bridged Bis(η^5-cyclopentadienyl)tin(II) Derivatives of α,α'-dicylcopentadienyl-*ortho- meta-* and *para*-Xylene, *J. Organomet. Chem.*, 264 (1984) 295.

M.J. Heeg, C. Janiak and J.J. Zuckerman, Decaphenylstannocene, [h^5-$(C_6H_5)_5$]Sn(II), the First Symmetrical Main-Group Sandwich Compound, *J. Am. Chem. Soc.*, 106 (1984) 4259.

J.T. Landrum, M.M. Amini and J.J. Zuckerman, Synthesis and Characterization of Tin(II) Tetraphenylporphyrin, *Inorg. Chim. Acta*, 90 (1984) L73.

F.A.K. Nasser, M.B. Hossain, D. van der Helm and J.J. Zuckerman, The Crystal and Molecular Structure of Dianthranilium Amide Dimethyltetrachlorotin(IV) Dihydrate, $[2\text{-}H_3NC_6H_4C(O)NH_2]_2^{2+}[(CH_3)_2SnCl_4]^{2-}$ $(\mu\text{-}H_2O)_2$ at 138 K. A Hydrogen-Bonded Network Lattice, *Inorg. Chem.*, 23 (1984) 606.

A.L. Rheingold, S.-W. Ng and J.J. Zuckerman, The X-Ray Crystal and Molecular Structures of the Monomeric 1:1 Adducts of Diphenyltin(IV) dichloride and Trimethyltin(IV) Chloride with 2,6-Dimethylpyridine (2,6-Lutidine) *N*-Oxide. A Five-Coordinated 1:1 R_2SnCl_2 Complex, *Organometallics*, 3 (1984) 233.

A.L. Rheingold, S.-W. Ng and J.J. Zuckerman, Crystal and Molecular Structure of *trans*-Dichloro-, *trans*-dimethyl-, *trans*-bis(hexamethylphosphoramido)tin(IV): $(CH_3)_2SnCl_2 \cdot 2\ O{=}P[N(CH_3)_2]_3$, *Inorg. Chim. Acta*, 86 (1984) 179.

C.D. Schaeffer, Jr., J.L. Lefferts and J.J. Zuckerman, Pulsed Fourier Transform NMR of Substituted Aryltrimethyltin Derivatives. V. Carbon-13 NMR Data for 1-and 2-Napththyltrimethylstannanes and 9-Phenanthryltrimethylstannane, *Org. Magn. Reson.*, 22 (1984) 125.

J.J. Zuckerman, The Noble Gas Compounds: What Might Have Been, *J. Chem. Educ.*, 61 (1984) 565.

J.J. Zuckerman, Organotin-119m Mössbauer Spectroscopy: The First Quarter Century, in *Chemical Mössbauer Spectroscopy* ed. by R.H. Herber, Plenum Press, New York, 1984, p. 267.

J.L. Baxter, E.M. Holt and J.J. Zuckerman, The X-Ray Crystal and Molecular Structure of Bis(biphenylyl-2)tin(IV) Dichloride, A Discrete Molecular Organotin Chloride, *Organometallics*, 4 (1985) 255.

T.S. Dory, J.J. Zuckerman and C.L. Barnes, Do Subvalent Main-Group Compounds Form Adducts with Main-Group Acceptors? The BF_3 Adduct of Stannocene, A Revision. The Crystal and Molecular Structure of $\{[BF_4]^-(\mu\text{-}\eta^5\text{-}C_5H_5)_2Sn[\mu\text{-}\eta^5\text{-}C_5H_5Sn]^+ \cdot THF\}_n$, *J. Organomet. Chem.*, 281 (1985) C1.

T.S. Dory, J.J. Zuckerman and M.D. Rausch, Functionally Substituted Stannocenes. η^5-Acetyl- and Alkoxycarbonylcyclopentadienyltin(II) Derivatives, *J. Organomet. Chem.*, 281 (1985) C8.

I. Haiduc and J.J. Zuckerman, *Basic Organometallic Chemistry*, Walter de Gruyter, Berlin, 1985.

E.M. Holt, F.A.K. Nasser, A. Wilson, Jr. and J.J. Zuckerman, Organo-germanium(IV), -tin(IV) and -lead(IV) Esters of 1-Pyrrolidinedithiocarbamic Acid. The Crystal and Molecular Structure of 1-Pyrrolidinedithiocarbamatotriphenyltin(IV) and Lead(IV), *Organometallics*, 4 (1985) 2073.

T.P. Lockhart, W.F. Manders and J.J. Zuckerman, Structural Investigations by ^{13}C Solid-State NMR. Dependence of $|^1J(^{119}Sn-^{13}C)|$ on Me–Sn–Me Angle in Methyltin(IV)s, *J. Am. Chem. Soc.*, 107 (1985) 4245.

F.A.K. Nasser and J.J. Zuckerman, *N*-Di- and Tri-organotin(IV) Derivatives of Saccharin, *J. Organomet. Chem.*, 266 (1984) 225; 295 (1985) C27.

S.-W. Ng and J.J. Zuckerman, Where Are the Lone-Pair Electrons in Subvalent Fourth-Group Compounds?, *Adv. Inorg. Chem. Radiochem.*, 29 (1985) 297.

H. Schumann, C. Janiak, E. Hahn, J. Löbel and J.J. Zuckerman, Decabenzylgermanocene: Synthese und Strukture eines monomeren, luftstabilen Germanocens, *Angew. Chem.*, 97 (1985) 765; Decabenzylgermanocene: Synthesis and Structure of a Monomeric, Air-Stable Germanocene, *Angew. Chem. Int. Ed. Engl.*, 24 (1985) 773.

M.M. Amini, A.L. Rheingold, R.W. Taylor and J.J. Zuckerman, The Importance of Hydrogen Bonding of Organotins in *Tin and Malignant Cell Growth*, J.J. Zuckerman (Ed.), CRC Press, Boca Raton, FL., 1986.

T.P. Lockhart, W.F. Manders, E.O. Schlemper and J.J. Zuckerman, Medium Effects on Molecular Structure. Carbon-13 Solid-State and Solution NMR and X-ray Diffraction Structures of Dimethyltin(IV)s. The Crystal and Molecular Structure of the Orthorhombic Modification of Bis(*N*,*N*-diethyldithiocarbamato)dimethyltin(IV), *J. Am. Chem. Soc.*, 108 (1986) 4074.

K.C. Molloy, T.G. Purcell, E. Hahn, H. Schumann and J.J. Zuckerman, Organotin Biocides 4. Crystal and Molecular Structure of Tricyclohexyltin(IV) 3-Indolylacetate, Incorporating the First Monodentate Carboxylate Group Bonded to a Triorganotin(IV), *Organometallics*, 5 (1986) 85.

H. Schumann, C. Janiak, E. Hahn, J. Loebel, M.D. Rausch, C.R.A. Kolax, J.J. Zuckerman and M.J. Heeg, Decabenzyl-germanocen, -stannocen und plumbocen. Synthese und Strukture von lufstabilen Metallocenen der 4. Hauptgruppe des Periodensystems der Elemente, *Chem. Ber.*, 119 (1986) 2656.

J.J. Zuckerman, The Coming Renaissance of Descriptive Chemistry, *J. Chem. Educ.*, 62 (1986) 829.

J.J. Zuckerman, Organotin Chemistry: A Brief Primer With Comments on Organometallic Chemotherapy, in *Tin as a Vital Trace Nutrient: Implications in Cancer Prophylaxis and Other Physiological Processes* (ed. by N.F. Cardarelli), CRC Press, Boca Raton, FL, 1986, p. 289.

J.J. Zuckerman (Ed.), *Inorganic Reactions and Methods*, VCH Publishers, Deerfield Beach, FL, Vol. 1, 1986, Vols. 2, 7, 10, 11, 15, 1986, in press.

J.J. Zuckerman (Ed.), *Tin and Malignant Cell Growth*, CRC Press, Boca Raton, FL, 1986, in press.

M.M. Amini, E.M. Holt and J.J. Zuckerman, Single Crystal and Molecular Structure of Methylphenyltin(IV) Dichloride, Intermediate Between Polymeric and Monomeric R_2SnCl_2 Structures, *J. Organomet. Chem.*, 327 (1987) 147.

C. Silvestru, I. Haiduc, S. Klima, U. Thewalt, M. Gielen, J.J. Zuckerman, Synthesis and Characterization of Di- and Triorganotin(IV) Diethyldithiophosphinates. The Crystal and Molecular Structure of Bis(diethyldithiophosphinato)dimethyltin(IV), $Me_2Sn(S_2PEt_2)_2$, *J. Organomet. Chem.*, 327 (1987) 181.

M.J. Heeg, R.H. Herber, C. Janiak, J.J. Zuckerman, H. Schumann, and W.F. Manders, Decaphenylgermanocene, -stannocene and -plumbocene, $[\eta^5\text{-}(C_6H_5)_5C_5]_2E$(II) (E = Ge, Sn, Pb) and the X-ray Crystal and Molecular Structure of Pentaphenylstannocene, $(\eta^5\text{-}C_6H_5)_5C_5SnC_5H_5$, *J. Organomet. Chem.*, 346 (1988) 321.

H. Schumann, C. Janiak, and J.J. Zuckerman, Tetraphenylcyclopentadien und (4-tert-Butylphenyl)tetraphenylcyclopentadien: Synthese und Charakterisierung ihrer Alkalimetallsalze und Metallocene von Germanium, Zinn und Blei, *Chem. Ber.*, 121 (1988) 207.