

## ALVIN A. HOLDER, Ph.D., MRSC, CChem

### EDUCATION

05/94: Ph.D. (Inorganic Chemistry), University of the West Indies (U.W.I.), Mona Campus, Jamaica. Advisor: Professor Tara P. Dasgupta. Thesis title: “*Synthesis, Characterisation, and Reactivity of some Coordinated Oxo-Molybdenum(VI) Complexes in Aqueous Solution.*”

07/89: B.Sc. (Special Chemistry), upper second class honors, U.W.I., Mona Campus, Jamaica.

### RESEARCH INTERESTS

My area of research centers around biological and inorganic chemistry, bioinorganic and inorganic reaction mechanisms, which includes the following:

- Synthesis and characterization of supramolecular polypyridyl ruthenium(II)/rhodium(III) complexes for bioinorganic studies of DNA recognition and reactions by metallointercalators, followed by their uses as anti-cancer agents in photodynamic therapy.
- The synthesis, characterization, and biomedical uses of vanadium complexes in alleviating diabetes.
- The synthesis, characterization, reactivity, and biomedical uses of NO<sub>x</sub>-containing compounds.
- Synthesis and characterization of novel non-hydrolyzable nucleotides (inclusive of C-13 labeled nucleotides); also cobalt(III), chromium(III) and vanadium(IV/V) complexes. Their uses as inhibitors of the enzymatic synthesis of DNA through the use of DNA polymerase β.
- The use of EPR {V(IV), Cu(II), and Mo(V) at ambient and liquid nitrogen temperatures}, NMR (<sup>95</sup>Mo, <sup>13</sup>C, <sup>1</sup>H, <sup>51</sup>V, <sup>19</sup>F, and <sup>31</sup>P), and other physical means in the structural elucidation of various transition metal complexes.

### RESEARCH EXPERIENCE

05/04-06/06: *Postdoctoral Fellow*, Department of Chemistry, Colorado State University, Fort Collins, Colorado 80523, U.S.A., with Professor Debbie C. Crans.

- Synthesized and characterized novel non-hydrolyzable nucleotides (inclusive of C-13 labeled nucleotides) and chromium(III) complexes, which were tested as inhibitors of the enzymatic synthesis of DNA through the use of DNA polymerase β.
- Synthesized and characterized vanadium complexes, which were tested as alleviators of diabetes.
- Characterized transition metal complexes in aqueous solution utilizing EPR {V(IV) at ambient and liquid nitrogen temperatures}, UV/Visible, <sup>31</sup>P, <sup>1</sup>H, <sup>13</sup>C, and <sup>51</sup>V NMR spectroscopy.
- Supervised undergraduate students in the research area of vanadium chemistry.
- Participated as a judge in an undergraduate research poster competition.

09/03-04/04: *Postdoctoral Fellow*, Department of Biochemistry, The Ohio State University, Columbus, Ohio 43210, U.S.A., with Professor Peng George Wang.

- Studied the binding of some known intercalators of DNA with the use of isothermal titration calorimetry and the quartz crystal microbalance.

- Studied enzymatic processes involving the enzyme,  $\alpha$ -1,3-galactosyltransferase.

08/02-06/03: **Research Scientist**, Department of Chemistry, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061, U.S.A., with Professor Karen J. Brewer.

- Synthesized and characterized supramolecular polypyridyl ruthenium(II)/rhodium(III) complexes, which were used in the photocleavage of pUC18 and pBluescript DNA plasmids.
- Utilized photochemical, fluorescence microscopy, and electrochemical techniques in the research area of DNA recognition and reactions by metallointercalators.
- Utilized agarose gel electrophoresis, polyacrylamide gel electrophoresis, and chromatography in the separation of photocleaved DNA.
- Carried out experiments involving the growing of Vero cells, and the inhibition of cell growth of Vero cells *in vitro* with ruthenium(II) and osmium(II) complexes in aqueous solution.
- Supervised undergraduate students in the research area of ruthenium chemistry, the photocleavage of pUC18 and pBluescript DNA plasmids, and the inhibition of cell growth of Vero cells *in vitro* with ruthenium(II) and osmium(II) complexes.

08/96-08/97: **Postdoctoral Fellow/Visiting Professor**, ExxonMobil Research and Engineering Company, New Jersey 08801, U.S.A., with Dr. Edward I. Stiefel.

- Synthesized, characterized, and studied the reactivity of nitrosyl complexes, molybdenum, rhenium, and tungsten supramolecular clusters.
- Application of such clusters as potential anti-friction agents.

06/95-09/95: **Leverhulme Fellow**, Department of Chemistry, University of Newcastle, Newcastle upon Tyne, NE1 7RU, U.K., with Professor A. Geoffrey Sykes.

- Synthesized, characterized, and studied the reactivity of molybdenum and tungsten supramolecular clusters (incomplete and complete cuboidal clusters) in aqueous solution.

10/90-05/94: **Graduate student**, U.W.I., Mona Campus, Jamaica, with Professor Tara P. Dasgupta.

- Synthesized some novel cobalt/chromium(III) ammine complexes, containing the molybdate(VI) oxoanion as monodentate and bidentate ligands; then characterized the complexes by UV/Visible spectroscopy, infrared spectroscopy,  $^{95}\text{Mo}$  NMR spectroscopy, and X-Ray Powder Diffraction.
- Carried out electrochemical studies on the cobalt/chromium(III) ammine complexes.
- Carried out kinetic studies on the formation and acid/base hydrolysis of the cobalt/chromium(III) ammine complexes using stopped-flow and conventional spectrophotometry.
- Carried out kinetic studies of the electron-transfer reactions between  $[(\text{H}_3\text{N})_5\text{Co}^{\text{III}}\text{OMo}^{\text{VI}}\text{O}_3]^+$  and (1) aqueous sulfite, (2)  $\text{K}_4\text{Fe}(\text{CN})_6$ , (3) *L*-ascorbic acid, and (4) *L*-cysteine using stopped-flow and conventional spectrophotometry.
- Carried out EPR studies for the reaction involving  $[(\text{H}_3\text{N})_5\text{Co}^{\text{III}}\text{OMo}^{\text{VI}}\text{O}_3]^+$  and *L*-cysteine in order to detect the very reactive Mo(V) monomer.

**TEACHING EXPERIENCE**

08/06-present: *Assistant Professor in Chemistry*, Department of Chemistry and Biochemistry, The University of Southern Mississippi, Hattiesburg, Mississippi 39406, U.S.A.

- Teaching and researching in inorganic chemistry.

05/02-06/02: *Visiting Professor in Chemistry*, Department of Chemistry, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061, U.S.A.

- Lectured the course General Chemistry 1035 in the first Summer session.

08/01-05/02: *Visiting Assistant Professor in Chemistry/Research Assistant Professor*, The University of Toledo, College of Arts and Sciences, Department of Chemistry, Toledo, Ohio 43606, U.S.A.

- Lectured general chemistry courses.
- Supervised the general chemistry laboratory course CHEM-1150: Concepts In Chemistry Laboratory.
- Supervised the general chemistry laboratory course CHEM 1260: Chemistry for Life Sciences Laboratory I and II.
- Supervised the advanced inorganic chemistry course: CHEM 3870: Advanced Laboratory II.
- Lectured the graduate course: CHEM 4980/6330/8330: Special Topics in Chemistry (Spectroscopic Methods and Analysis of Spectra).
- Conducted recitation classes in Chemistry 1090, Chemistry 1230, and Chemistry 1240.

01/94-08/01: *Temporary Assistant Lecturer in Physical Chemistry, Lecturer in Physical and Inorganic Chemistry*, U.W.I., Cave Hill Campus, Barbados.

- Lectured several courses in analytical, inorganic, and physical chemistry.
- Single-handedly developed, coordinated, and lectured a bioinorganic chemistry course.
- Instrumental in co-developing and co-lecturing a transition metal chemistry II course.
- Conducted recitation classes for courses involving analytical, inorganic, and physical chemistry.
- Supervised laboratory courses involving analytical, inorganic, and physical chemistry.
- Directly supervised a Ph.D. student, two M.Phil. students, and 14 undergraduate students.
- Instrumental in coordinating the first chemistry seminar series.

10/93-01/94: *Tutor in Chemistry*, U.W.I., Mona Campus, Jamaica.

- Conducted recitation classes in inorganic, organic, and physical chemistry courses at the introductory and advanced levels.
- Supervised and graded inorganic, organic, and physical laboratories at the introductory and advanced levels.

10/90-01/94: *Teaching Assistant (Demonstrator)*, U.W.I., Mona Campus, Jamaica.

- Supervised and graded inorganic, organic, and physical laboratory courses at the introductory and advanced levels.

09/89-07/91: *High School Chemistry Teacher*.

- Taught the equivalent of general chemistry at various secondary schools in Barbados and Jamaica.

## **STUDENTS SUPERVISED**

### **Graduate Dissertations**

10/03: Sophia C. Marshall, Ph.D. (Inorganic Chemistry), U.W.I., Cave Hill Campus, Barbados. Thesis title: *“The Kinetics and Mechanism of the Decomposition of Several Vasodilators by a Bronchoconstrictor, Aqueous Sulphite.”*

### **Present Graduate Students**

08/02-present: Ross F.G. Brown (M.Phil.). Thesis title: *“Studies of The Interaction Between Nitric Oxide and S-Nitrosothiols with Analogues of Hydroxocobalamin In Aqueous Solution-Clues from Physiological and Physical Studies.”* Co-supervised by Professor Tara P. Dasgupta, U.W.I., Mona Campus, Jamaica.

08/01-present: Vince C.R. Payne (Ph.D.). Thesis title: *“Synthesis, Characterisation of some Transition Metal Complexes of Dipicolinic Acid in Non-Aqueous Media.”* Co-supervised by Dr. Anthony M. Newton, U.W.I., Cave Hill Campus, Barbados.

08/99-present: Gabriel Harewood (Ph.D.). Thesis title: *“Syntheses, Characterization, and Reactivity of Some Salicylaldehyde-Based Ligands (Schiff Bases) and Corresponding Metal Complexes.”* Co-supervised by Professor Tara P. Dasgupta, U.W.I., Mona Campus, Jamaica.

### **Former Undergraduate students, Department of Chemistry, Colorado State University, Fort Collins, Colorado 80523, U.S.A.**

05/04-06/06: Barbara K. Hughes and Shelly Hay.

### **Former Undergraduate Students, U.W.I., Cave Hill Campus, Barbados (Out of a total of 14)**

00-01: Robin-Simone Rocke (U.W.I., St. Augustine Campus, Trinidad and Tobago), Celina Franklin, and Ezra Maynard.

99-00: Martin Hall and Gabriel Harewood (U.W.I., Mona Campus, Jamaica).

98-99: Ross F.G. Brown (U.W.I., Mona Campus, Jamaica), Maria D. Cozier, Walter Alleyne Jnr. (U.W.I., Mona Campus, Jamaica), and Christopher O. Bovell (University of Bristol, U.K.).

97-98: Alex Waterman (University of Surrey).

95-96: Junior Welch.

94-95: Shawn Phillips (University of Newcastle, U.K.), Leslie Wellington, and Kendi Cumberbatch-King

## **SKILLS**

- Excellent communicative and collaborative skills (grant proposals and publications).
- Extensive experience in the use of conventional and stopped-flow UV/Visible spectrophotometers, Schlenk lines, glove box, and infrared spectrometers.
- Extensive experience in techniques involving isothermal titration calorimetry (ITC), quartz crystal microbalance (QCM), mass spectrometry, Raman spectrometry, cyclic

voltammetry, crystal growth for X-ray crystallography, syntheses and chromatographic separations under oxygen free conditions.

- Extensive experience in the use of biological protocols, for example, fast liquid chromatography (FPLC), electrophoresis, dialysis, equilibrium dialysis, and ultrafiltration, to name a few.
- Extensive experience in the isolation and purification of DNA plasmids from *E. coli*.
- Very proficient in molecular biology, fluorescence microscopy, handling of cells *in vitro*, photochemistry, enzymology, and many other protocols, which are all biochemically related.
- Synthetic inorganic chemist, utilizing various organic ligands for catalytic processes, bioinorganic/medicinal chemistry, and photodynamic therapy.
- Extensive experience in EPR {V(IV), Cu(II), and Mo(V) at ambient and liquid nitrogen temperatures} and NMR measurements (<sup>95</sup>Mo, <sup>13</sup>C, <sup>1</sup>H, <sup>51</sup>V, <sup>19</sup>F, and <sup>31</sup>P) for structural elucidation of organometallic compounds.
- Experience in the synthesis and characterization of nucleotides, and their coordination complexes with transition metal ions.
- Trained at Exxon Research and Engineering Company, New Jersey 08801, in the safe use of a nitric oxide producing apparatus for the synthesis of nitrosyl complexes.

#### **AWARDS**

08/05: American Chemical Society Biological Chemistry Division Travel Award to attend the 230<sup>th</sup> American Chemical Society National Meeting, Washington, D.C., August 28-September 01, 2005.

03/03: Postdoctoral Travel Grant from Virginia Polytechnic Institute and State University to attend the 225<sup>th</sup> American Chemical Society National Meeting, New Orleans, Louisiana, March 23-27, 2003.

07/01-08/01: Recipient of an award from the Caribbean Academy of Sciences (CARISCIENCE) for research conducted at the University of the West Indies, Mona Campus, with Professor Tara P. Dasgupta.

07/00-08/00: Recipient of the American Chemical Society International Initiatives Program for collaborative visits to New York University and Wayne State University, Detroit, Michigan.

08/96-08/97: U.W.I./Inter-American Development Bank Staff Training Program Award: Postdoctoral Fellow/Visiting Professor at Exxon Research and Engineering Company, Clinton Township, New Jersey, U.S.A., with Dr. Edward I. Stiefel. **US\$39,000**

06/95-09/95: Leverhulme Fellowship for research with Professor A. Geoffrey Sykes at the University of Newcastle, Newcastle upon Tyne, U.K.

#### **AFFILIATIONS**

1997-present: The Royal Society of Chemistry, U.K.

1997-present: The American Chemical Society.

## PROFESSIONAL SERVICE

09/02: Wrote questions for a general chemistry text ("*General Chemistry*", 7<sup>th</sup> edition by Kenneth W. Whitten, Raymond E. Davis, Larry M. Peck, and George G. Stanley), Brooks/Cole Publishing, U.S.A.

12/99-08/01: Secretary of the University Staff Gym Committee, U.W.I., Cave Hill Campus, Barbados.

09/98-05/99: Chairman, Department of Biological and Chemical Sciences' Safety Committee, U.W.I., Cave Hill Campus, Barbados.

09/95-08/01: Chemistry Seminar Co-ordinator, Department of Biological and Chemical Sciences, U.W.I., Cave Hill Campus, Barbados.

09/95-05/96: Dean's Nominee for the Library Advisory Committee, U.W.I., Cave Hill Campus, Barbados.

03/95-present: Assistant Chief Examiner in Chemistry (the Caribbean Secondary Education Certificate) for the Caribbean Examinations Council, Barbados.

09/94: Co-developed the first undergraduate chemistry research projects in the Department of Chemistry, U.W.I., Cave Hill Campus, Barbados.

## RESEARCH GRANTS

12/99-12/00: A Royal Society of Chemistry John William Thomas Jones Research Fund Grant for studies on the chemistry of rhenium complexes. **US\$1,800**

12/98-12/99: A Royal Society of Chemistry John William Thomas Jones Research Fund Grant for studies on the chemistry of rhenium complexes. **US\$1,800**

10/98-10/00: A Wellcome Trust International Research Development Award. Research involving the bioinorganic chemistry of purple acid phosphatase isolated from soybeans, sweet potatoes, and the porcine uterine fluids. A collaborative effort with Professor A. Geoffrey Sykes of the Department of Chemistry, University of Newcastle, Newcastle upon Tyne, NE1 7RU, U.K. **US\$62,000**

06/98-09/98: A Wellcome Research Travel Grant. Research involving the bioinorganic chemistry of purple acid phosphatase isolated from soybeans, sweet potatoes, and the porcine uterine fluids. A collaborative effort with Professor A. Geoffrey Sykes at the Department of Chemistry, University of Newcastle, Newcastle upon Tyne, NE1 7RU, U.K. **US\$2,800**

## PUBLICATIONS

1. Holder, Alvin A.; Dasgupta, Tara P. "Synthesis, acid hydrolysis and formation of the  $[(\text{H}_3\text{N})_5\text{CoOMoO}_3]^+$  ion in aqueous solution." *J. Chem. Soc., Dalton Trans.* **1996**, 2637-2643.

2. Varey, Jane E.; Lamprecht, Gert J.; Fedin, Vladimir P.; Holder, Alvin A.; Clegg, William; Elsegood, Mark R.J.; Sykes, A. Geoffrey. "Interconversion and Reactivity of Two Heterometallic Tin-Containing Cuboidal Clusters from  $[\text{Mo}_3\text{S}_4(\text{H}_2\text{O})_9]^{4+}$ : X-ray Structure of the Single Cube with an  $\text{Mo}_3\text{SnS}_4$  Core." *Inorg. Chem.* **1996**, 35, 5525-5530.
3. Holder, Alvin A.; Dasgupta, Tara P. "Mechanism of the Oxidation of *L*-Ascorbic Acid by the Molybdato-pentaamminecobalt(III) Ion in Aqueous Solution." *Transition Met. Chem.* **1997**, 22, 135-140.
4. Holder, Alvin A.; Dasgupta, Tara P.; McFarlane, William; Rees, Nicholas H.; Enemark, John H.; Pacheco, Andy; Christensen; Kenner. "Syntheses, Characterisation, Infrared and  $^{95}\text{Mo}$  NMR of Some Coordinated Oxo-Molybdenum(VI) Complexes." *Inorg. Chim. Acta* **1997**, 260, 225-228.
5. Holder, Alvin A.; Dasgupta, Tara P. "Synthesis, Acid Hydrolysis and Formation of the Molybdato-pentaamminechromium(III) Ion in Aqueous Solution." *Inorg. Reaction Mech.* **1999**, 1, 177-188.
6. Holder, Alvin A.; Brown, Ross F.G.; Marshall, Sophia C.; Payne, Vince C.R.; Cozier, Maria D.; Alleyne, Walter A.; Bovell, Christopher O. "Mechanism of the oxidation of *L*-ascorbic acid by the bis(pyridine-2,6-dicarboxylate)cobaltate(III) ion in aqueous solution." *Transition Met. Chem.* **2000**, 25, 605-611.
7. Holder, Alvin A.; Dasgupta, Tara P. "Kinetics and Mechanism of the Reduction of the Molybdato-pentaamminecobalt(III) Ion by Aqueous Sulfite and Aqueous Potassium Hexacyanoferrate(II)." *Inorg. Chim. Acta* **2002**, 331, 279-289.
8. Fang, Zhenglai; Swavey, Shawn; Holder, Alvin; Winkel, Brenda; Brewer, Karen J. "DNA Binding of Mixed-Metal Supramolecular Ru,Pt Complexes." *Inorg. Chem. Commun.* **2002**, 5, 1078-1081.
9. Holder, Alvin A.; Marshall, Sophia C.; Wang, Peng George; Kwak; Chee-Hun "The Mechanism of the Decomposition of a Bronchodilator, *S*-Nitroso-*N*-acetyl-*D,L*-penicillamine (SNAP) by a Bronchoconstrictor, Aqueous Sulfite:- Detection of the *N*-nitrosohydroxylamine-*N*-sulfonate ion." *Bull. Korean Chem. Soc.* **2003**, 24, 350-356.
10. Holder, Alvin A.; Swavey, Shawn; Brewer, Karen J. "Design Aspects for the Development of Mixed-Metal Supramolecular Complexes Capable of Visible Light Induced Photocleavage of DNA." *Inorg. Chem.* **2004**, 43, 303-308.
11. Holder, Alvin A.; Stibrany, Robert T.; Bolotina, Nadejda; Hall, Martin; Payne, Vince C.R.; Kirschbaum, Kristin; Pinkerton, A. Alan; Newton Anthony M. "Synthesis and structure of [(nitrito-*O,O'*)bis(di-2-pyridylamine)copper(II)] nitrite." *J. Chem. Cryst.* **2004**, 34, 383-386.

12. Holder, Alvin A. "Chromium, molybdenum, and tungsten." *Annu. Rep. Prog. Chem., Sect. A* **2005**, 101, 161-163.
13. Bakir, M.; Harewood, G.R.; Holder, Alvin; Hassan, I.; Dasgupta, T.; Maragh, P.; Singh-Wilmot, M. "Synthesis, spectroscopic and structural analysis of 5-(4-methylphenyldiaz-enyl)salicylaldehyde." *Acta Crystallogr.* **2005**, E61, o1611-o1613.
14. Wilkins, Patricia C.; Johnson, Michael D.; Holder, Alvin A.; Crans, Debbie C. "Reduction of Vanadium(V) by *L*-Ascorbic Acid at Low and Neutral pH: Kinetic, Mechanistic and Spectroscopic Characterization." *Inorg. Chem.* **2006**, 45, 1471-1479.
15. Cohen, Mitchell D.; Prophete, Colette; Sisco, Maureen; Chen, Lung-chi; Zelikoff, Judith T.; Smee, Jason J.; Holder, Alvin A.; Crans, Debbie C. "Pulmonary Immunotoxic Potentials of Metals Are Governed by Select Physicochemical Properties: Chromium Agents." *J. Immunotoxicol.* **2006**, 3, 69-81.
16. Storrie, Brain; Holder, Alvin; Brewer, Karen J. "Ru, Os, Rh mixed-metal complexes are a potential novel class of oxygen independent photosensitizers for photodynamic therapy (PDT)." *Proc. SPIE-The International Society for Optical Engineering* **2006**, 6139, 336-342.
17. Holder, Alvin A. "Chromium, molybdenum, and tungsten." *Annu. Rep. Prog. Chem., Sect. A* **2006**, 102, 194-220.
18. Payne, Vince C.R.; Headley, Oliver St.C.; Stibrany, Robert T.; Maragh, Paul T.; Dasgupta, Tara P.; Newton, Anthony M.; Holder, Alvin A. "The Crystal Structure of a Bis(2,6-pyridinedicarboxylato)chromate(III) Anion with an Elaborate Network of Hydrogen Bonding and  $\pi$  Stacking." *J. Chem. Cryst.* accepted for publication.
19. Cohen, Mitchell D.; Sisco, Maureen; Prophete, Colette; Chen, Lung-chi; Zelikoff, Judith T.; Smee, Jason J.; Holder, Alvin A.; Ghio, Andy J.; Stonehuerner, J.D.; Crans, Debbie C. "Pulmonary Immunotoxic Potentials of Metals Are Governed by Select Physicochemical Properties: Vanadium Agents." *J. Immunotoxicol.* **2007**, 4, in press.

#### CHAPTERS IN TEXTBOOKS

1. "NO and NO Donors" Cai, Tingwei Bill; Wang, Peng George; Holder, Alvin A. in "Nitric Oxide Donors for Pharmaceutical and Biological Applications." Wang, Peng George; Cai, Tingwei Bill, Taniguchi, Naoyuki, Eds, Wiley-VCH Verlag GmbH & Co. KgaA., Weinheim, Germany, **2005**, Chapter 1, pp. 3-31.

#### CONFERENCE PRESENTATIONS

1. 205<sup>th</sup> Spring Meeting of the American Chemical Society, Denver, Colorado, March 28-April 2, 1993. Title: "Oxidation of L-ascorbic acid by the molybdatopentaamminecobalt(III) ion in aqueous solution." Authors: Alvin A. Holder and Tara P. Dasgupta.
2. 11<sup>th</sup> Caribbean Conference of Chemistry and Chemical Engineering, St. Augustine, Trinidad and Tobago, March 6-10, 1995. Title: "Kinetics and Mechanism of the Acid

- Catalysed Hydrolysis of the molybdatopentaamminecobalt(III) ion in aqueous solution.”  
 Authors: Alvin A. Holder and Tara P. Dasgupta.
3. 4<sup>th</sup> International Congress on Chemistry/13<sup>th</sup> Caribbean Conference on Chemistry and Chemical Engineering, Havana International Conference Center, Cuba, April 16-20, 2001. Title: “The use of Tunicates as Indicators of Water Quality along the North and West Coasts of Barbados.” Authors: Harold A.A. Gibbs, Maurice A. Campbell, and Alvin A. Holder.
  4. 222<sup>nd</sup> American Chemical Society National Meeting, Chicago, Illinois, August 26-30, 2001. Title: “Kinetics and Mechanism of the Reaction of *S*-nitroso-*N*-acetyl-*D,L*-penicillamine and Aqueous Sulfite.” Authors: Sophia Cheery-Ann Marshall, Alvin A. Holder, and D. Lyn H. Williams.
  5. The 23<sup>rd</sup> Annual American Cancer Society, Virginia Division Seminar on Basic and Clinical Cancer Research, Jordan Hall Conference Center, University of Virginia, Charlottesville, Virginia, March 22, 2003. Title: “Supramolecular Complexes as a New Structural Motif for the Development of a Novel Class of Photodynamic Therapy Agents.” Authors: Alvin A. Holder, Shawn M. Swavey, R. Lee Williams, Maria Teresa Tarrago-Trani, Brian Storrie, and Karen J. Brewer.
  6. 225<sup>th</sup> American Chemical Society National Meeting, New Orleans, Louisiana, March 23-27, 2003. Title: “Mixed-metal supramolecular complexes as DNA photocleavage and photodynamic therapy agents.” Authors: Karen J. Brewer, Alvin A. Holder, and Shawn M. Swavey.
  7. 225<sup>th</sup> American Chemical Society National Meeting, New Orleans, Louisiana, March 23-27, 2003. Title: “Mixed-metal supramolecular complexes as photochemical molecular devices and DNA binding and photocleavage agents.” Authors: Karen J. Brewer, Alvin A. Holder, R. Lee Williams, Shawn M. Swavey, and Mark Elvington.
  8. 226<sup>th</sup> American Chemical Society National Meeting, New York, New York, September 7-11, 2003. Title: “Syntheses and Characterisation of Some Oxovanadium(V) Complexes Involving Salicylaldimine-Based Ligands—Attempts To Prepare Insulin Mimicking Compounds.” Authors: Gabriel R. Harewood, T. P. Dasgupta, Alvin A. Holder, Xiaoping Tang, William McFarlane, Paul T. Maragh, and Donovan A. Dixon.
  9. 226<sup>th</sup> American Chemical Society National Meeting, New York, New York, September 7-11, 2003. Title: “Syntheses and Characterisation of Some Novel Tetranuclear Copper(II) Complexes Derived From Salicylaldimine-Based Ligands.” Authors: Gabriel R. Harewood, T. P. Dasgupta, Alvin A. Holder, Ishmael Hassan, Xiaoping Tang, Paul T. Maragh, Donovan A. Dixon, and Marvadeen A. Singh-Wilmot.
  10. 226<sup>th</sup> American Chemical Society National Meeting, New York, New York, September 7-11, 2003. Title: “Photochemical Properties of Rhodium(III) Centered Triads of Ruthenium(II) and Osmium(II): Uses as Photochemical Molecular Devices and DNA

- Photocleavage Agents.” Authors: Karen J. Brewer, Mark Elvington, Alvin A. Holder, and Shawn M. Swavey.
11. 55<sup>th</sup> Southeast Regional Meeting of the American Chemical Society, Atlanta, Georgia, November 16-19, 2003. Title: “Mixed-metal supramolecular complexes and their light activated interactions with biological targets.” Authors: R. Williams, Alvin Holder, and Karen Brewer.
  12. 55<sup>th</sup> Southeast Regional Meeting of the American Chemical Society, Atlanta, Georgia, November 16-19, 2003. Title: “Supramolecular mixed-metal complexes of ruthenium(II) and rhodium(III).” Authors: Karen Brewer, Mark Elvington, Shawn Swavey, and Alvin Holder.
  13. 227<sup>th</sup> American Chemical Society National Meeting, Anaheim, California, March 28-April 1, 2004. Title: “Photochemical reactivity of the MMCT states of rhodium(III) centered triads of ruthenium(II) and osmium(II): From photoinitiated electron collection to photodynamic therapy agents.” Authors: Karen J. Brewer, Alvin A. Holder, Mark Elvington, and Julie Davenport.
  14. 227<sup>th</sup> American Chemical Society National Meeting, Anaheim, California, March 28-April 1, 2004. Title: “Comparison of a series of phenanthrolinequinone thiosemicarbazone compounds.” Authors: Richard A. Lawson, Richard T. Mayes, Alvin A. Holder, and Edward C. Lisic.
  15. 228<sup>th</sup> American Chemical Society National Meeting, Philadelphia, Pennsylvania, August 22-26, 2004. Title: “Light induced DNA cleavage and photodynamic therapy properties of MMCT states of rhodium centered supramolecular complexes.” Authors: Karen J. Brewer, Alvin A. Holder, Mark Elvington, R. Lee Williams, Jerita Dubash, and Brenda S.J. Winkel.
  16. The Fourth International Symposium on Chemistry and Biological Chemistry of Vanadium, September 3-5, 2004, Szeged, Hungary. Title: “A Reinvestigation of the Ascorbic Acid Reduction of Vanadium(V).” Authors: Patricia C. Wilkins, Michael D. Johnson, Alvin A. Holder, and Debbie C. Crans.
  17. 229<sup>th</sup> American Chemical Society National Meeting, San Diego, California, March 13-17, 2005. Title: “Reinvestigation of the reduction of aqueous vanadium(V) by ascorbic acid: Evidence for both inner and outer sphere pathways.” Authors: Michael D. Johnson, Patricia C. Wilkins, Debbie C. Crans, and Alvin A. Holder.
  18. 229<sup>th</sup> American Chemical Society National Meeting, San Diego, California, March 13-17, 2005. Title: “An investigative study involving the interaction between the vanadyl cation and NADH in aqueous solution.” Authors: Debbie C. Crans, Barbara K. Hughes, and Alvin A. Holder.

19. 47<sup>th</sup> Rocky Mountain Conference on Analytical Chemistry, Grand Hyatt Denver, Denver, Colorado, July 31-August 4, 2005. Title: "An EPR Study of Reactions of Aqueous Vanadium with NADH." Authors: Alvin A. Holder, Barbara K. Hughes, and Debbie C. Crans.
20. 230<sup>th</sup> American Chemical Society National Meeting, Washington, D.C., August 28-September 1, 2005. Title: "AEI: Reactions of Aqueous Vanadium with NADH." Authors: Alvin A. Holder, Barbara K. Hughes, and Debbie C. Crans.
21. 230<sup>th</sup> American Chemical Society National Meeting, Washington, D.C., August 28-September 1, 2005. Title: "The dynamic interaction of the tetrasodium salt of cobalt(II)-4,4',4'',4'''-tetrasulfophthalocyanine (CoTSPc) and its nitrosated analogue, with various S-nitrosothiols and thiols, respectively." Authors: Ross Brown, Tara P. Dasgupta, Paul T. Maragh, and Alvin A. Holder.
22. 230<sup>th</sup> American Chemical Society National Meeting, Washington, D.C., August 28-September 1, 2005. Title: "Syntheses and characterizations of some transition metal complexes containing 2,6-pyridinedicarboxylic acid and various amines." Authors: Vince C.R. Payne, Anthony M. Newton, Tara P. Dasgupta, Paul T. Maragh, Marvadeen A. Singh-Wilmot, Robert T. Stibrany, Kristin, Kirschbaum, Mark R.J. Elsegood, and Alvin A. Holder.
23. 231<sup>st</sup> American Chemical Society National Meeting, Atlanta, Georgia, March 26-30, 2006. Title: "Characterization of a soluble lead(II)-dipicolinate complex and its effect as a pulmonary immunomodulatory agent." Authors: Shelly Hay, Alvin A. Holder, Debbie C. Crans, Colette Prophete, Maureen Sisco, and Mitchell D. Cohen.
24. 231<sup>st</sup> American Chemical Society National Meeting, Atlanta, Georgia, March 26-30, 2006. Title: "Interactions of NADH with aqueous vanadium(IV)." Authors: Barbara K. Hughes, Alvin A. Holder, and Debbie C. Crans.
25. 232<sup>nd</sup> American Chemical Society National Meeting, San Francisco, California, September 10-14, 2006. Title: "Kinetics of NADH binding to aqueous vanadium(IV)." Authors: Jeremy Lenhardt, Alvin A. Holder, Barrbara k. Hughes, Michael D. Johnson, and Debbie C. Crans.
26. 232<sup>nd</sup> American Chemical Society National Meeting, San Francisco, California, September 10-14, 2006. Title: "Lipophilic vanadium compounds drive translocation of insulin receptors into rafts." Authors: Deborah A. Roess, Steven M.L. Smith, Alvin A. Holder, and Debbie C. Crans.
27. 232<sup>nd</sup> American Chemical Society National Meeting, San Francisco, California, September 10-14, 2006. Title: "Role of physicochemical properties in pulmonary immunotoxic potentials of vanadium compounds." Authors: Alvin A. Holder, Colette Prophete, Maureen Sisco, Lung-Chi Chen, Judith T. Zelikoff, Jason J. Smee, Debbie C. Crans, and Mitchell D. Cohen.

28. 232<sup>nd</sup> American Chemical Society National Meeting, San Francisco, California, September 10-14, 2006. Title: "Synthesis and characterization of some Schiff Base complexes of vanadium(V).-A search for an effective insulin-enhancing compound." Authors: Alvin A. Holder, Gabriel R. Harewood, Kerry-Ann Green, Paul T. Maragh, and Tara P. Dasgupta.

### **INVITED SEMINAR PRESENTATIONS**

02/03: Julius Chambers Biomedical/Biotechnical Research Institute (BBRI), North Carolina Central University, 1801 Fayetteville Street, Durham, NC 27707, U.S.A. Title: "Ligand and Induced Redox Processes-The Molybdenum, Chalcogen, and Nitric Oxide Story."

03/03: Department of Chemistry, Jackson State University, P.O. Box 17910, Jackson, MS 39217, U.S.A. Title: "A Unique Induced Electron Transfer Process Involving NO<sub>x</sub> Species."

04/03: Department of Chemistry, Hampton University, Hampton, VA 23668, U.S.A. Title: "Reactivity of some Sulfur-Containing Species with NO<sub>x</sub> Compounds."

12/05: Department of Chemistry and Biochemistry, Northern Arizona University, Flagstaff, AZ 86011, U.S.A. Title: "Synthesis, Characterization, and Bioinorganic Chemistry of Transition Metal Complexes. Their Use as Potential Photodynamic Therapeutic Agents."

02/06: Department of Chemistry and Biochemistry, The University of Southern Mississippi, Hattiesburg, MS 39406, U.S.A. Title: "Bioinorganic Chemistry of Some Transition Metal Complexes."

### **CONFERENCE ORGANIZER**

Co-organized the 5<sup>th</sup> International Symposium on the Chemistry and Biological Chemistry of Vanadium, 232<sup>nd</sup> Meeting of the American Chemical Society, September 10-14, 2006, San Francisco, California, U.S.A.

### **EDITORIAL REVIEWER**

04/05-present: The Journal of Chemical Education.

### **COLLABORATIONS**

#### **Present Collaborators**

- (1) Professor Tara Dasgupta, Department of Chemistry, University of the West Indies, Mona Campus, Kingston 7, Jamaica.
- (3) Dr. Don VanDerveer, Director, Molecular Structure Center, Chemistry Department, Clemson University, Clemson, SC 29634, U.S.A.
- (4) Professor Karen J. Brewer, Department of Chemistry, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061, U.S.A.

- (5) Professor Bruce A. Averill, Department of Chemistry, The University of Toledo, 2801 West Bancroft Street Toledo, Ohio 43606, U.S.A.
- (6) Dr. Mark Elsegood, Chemistry Department, Loughborough University, Loughborough, Leicestershire, LE11 3TU, U.K.
- (7) Professor William McFarlane, Chemistry Department, University of Newcastle, Newcastle upon Tyne, NE1 7RU, U.K.
- (8) Professor Chee-Hun Kwak, Head, Department of Chemistry, Sunchon National University, Sunchon, Chonnam, 540-742, Republic of Korea.
- (9) Professor Glenn L. Millhauser, Department of Chemistry & Biochemistry, University of California Santa Cruz, Santa Cruz, CA 95064, U.S.A.
- (10) Professor Debbie C. Crans, Department of Chemistry, Colorado State University, Fort Collins, Colorado 80523, U.S.A.

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