

CURRICULUM VITAE

Mark A. Johnson

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Born: December 12, 1954

I. EDUCATION

Stanford University, Stanford, California
1977-1983, Ph.D. Physical Chemistry

University of California, Berkeley
1973-1977, B.S. Chemistry

II. ACADEMIC POSITIONS

Yale University, Assistant Professor of Chemistry, 1985-1990
Yale University, Associate Professor of Chemistry, 1990-1993
Yale University, Professor of Chemistry, 1993-2006
Yale University, Director of Graduate Studies, Chemistry, 2002-2004
Yale University, Arthur T. Kemp Professor, 2006-Present

III. OTHER POSITIONS

J.I.L.A. and University of Colorado, Boulder
Postdoctoral Associate with Professor W. C. Lineberger 1983-1985

IV. ACADEMIC HONORS

2016 Visiting Miller Research Professor, U.C. Berkeley
2014 Elected Member, National Academy of Sciences
2014 ACS Irving Langmuir Award in Chemical Physics
2012 Alexander von Humboldt Senior Research Award
2011 Chair, ACS Division of Physical Chemistry
2010 Elected Fellow, American Chemical Society
2009 Elected Fellow, American Academy of Arts and Sciences
2008 Yale Award for Advancement of Basic and Applied Science
2007 Chair, APS Division of Laser Science
2007 Dylan Hixon '88 Prize for Teaching Excellence in the Natural Sciences
2006 Plyler Prize for Molecular Spectroscopy, American Physical Society
2005 Elected Fellow, American Association for Advancement of Science (AAAS)

2005 Distinguished Visitor, J.I.L.A.
2004 NSF Award for Special Creativity
2001 Japan Soc. for the Promotion of Science (J.S.P.S.) Fellow
1999 Elected, Fellow of the American Physical Society
1999 Professor Invité, Université de Paris-Nord
1997 Invited Lecturer by Chemical Society of Brazil (Sao Paulo, Rio de Janero)
1994 Professor Invité, Université de Paris-Sud, Orsay
1990 Camille and Henry Dreyfus Teacher-Scholar Award
1988 Yale College Junior Faculty Fellowship
1987 NSF Presidential Young Investigator
1986 Professor Invité, Université de Paris, Orsay
1985 Dreyfus Distinguished New Faculty
1985 Shell Faculty Fellowship
1977 E. D. North Prize for Academic Excellence, UCB College of Chemistry
1977 B.S. Highest Honors, University of California, Berkeley
1977 Election to Phi Beta Kappa
1976 ARCS Award, Lawrence Berkeley Laboratory
1972 Eagle Scout, Troop 257, Oakland, California

SELECTED LECTURES

2016 Stauffer Lecturer (2), Stanford University
2015 Reilly Lectures in Physical Chemistry (3, Notre Dame)
2015 Plenary Lecture. Bunsentagung 2015, Bochum, Germany
2015 Harry Emmett Gunning Lecture Series, (3) University of Alberta
2015 Student Invited Lecture, Analytical Division, University of Illinois
2015 McElvein Lecture, University of Wisconsin
2015 Harvard-MIT R.B. Woodward Lecture in the Chemical Sciences
2014 Duquesne Pittcon Lectures (2)
2014 Keynote lecture, Graduate Research Seminar, Vibrational Spec. GRC
2014 Student invited lecture, University of Indiana
2013 Plenary Lecture, German Physical Society National Meeting, Hannover
2012 Keynote Lecture, Gordon Res. Conf. on Vibrational Spectroscopy
2012 Baker Lecture Symposium, Cornell University
2012 Basler Chemische Gesellschaft Lecture
2012 Spectroscopy Frontiers Lectures, The Ohio State University (3)
2011 Fenn Memorial Symposium, Virginia Commonwealth University
2009 Watkins Lectures, Wichita State (2)
2007 Beckman Scholar Symposium, California Institute of Technology
2005 Condon Lecture, University of Colorado, Boulder

V. PROFESSIONAL SERVICE **ESD, S3C**

2016 ACS Symposium co-chair (Zlatko Bacic), Anharmonicity in floppy systems

2014 Advisory Committee, NSF Center for Chemistry as the space-time limit
2012- 2015 International Advisory Committee, Molecular Spectroscopy Symposium
2012 Guest Editor for Special ChemPhysChem Issue on "Aggregation"
2011 Guest Editor, Accounts of Chemical Research issue on "Water"
2011-present Co-Editor, Annual Review of Physical Chemistry
2011 Chair, ACS Division of Physical Chemistry
2010 Chair, External Review of U. Amherst Chemistry Department
2008 ACS Symposium on reaction dynamics in condensed phase and in isolation
2008 Review panel for NSF Center of Chemical Bonding Phase II proposals
2007 Chair, APS Division of Laser Science
2007 Co-Chair of ACS symposium "The Proton", Chicago National meeting, March 2007
2006 Co-Chair of mini symp. on the spectroscopy of water, Mol. Spec. Symp. Columbus
2005 ACS Executive committee, Division of Physical Chemistry
2004 International Advisory committee for Conf. on Size-Selected Clusters, 2005-present
2003 ACS Anaheim Symposium Co-Chair for "Ions and Open Shell Systems"
2003 APS Division of Chemical Physics nominating committee
2003 Selection Committee for ACS Langmuir Award
2002 Guest Editor, *Int. J. Mass Spect.* issue on Van der Waals Cluster and their ions
2001 Review panel for Oak Ridge Chemical Sciences
2001 Selection Committee, APS Plyler prize for spectroscopy
2001 Executive committee for Division of Laser Science, A.P.S.
2001 Review panel for Oak Ridge Chemical Sciences
2001 Elected to executive committee for Division of Laser Science, A.P.S.
1998 Symposium co-chair, SPIE meeting on Photoionization in Intense Fields
1999 ACS New Orleans Symposium chair for "Water in Physics, Chemistry and Biology"
1999 Co-organizer of "Advances in Chemistry" Symposium, Napa, California
1995 Lecturer at the NATO ASI on Gas Phase Ions, Garmische, Germany
1995 Guest editor, *J. Phys. Chem.* Festschrift honoring William Chupka
1994 ACS Symp. Chair, "Reactions in Clusters" San Diego National ACS meeting
1993 Chair for Yale Symposium on Recent Developments in Photoionization
1992 Executive Committee, Division of Physical Chemistry, ACS

GORDON RESEARCH CONFERENCES CHAIRED

2015 Gordon Conference on Gaseous Ions
2001 Gordon Research Conference on Photoions (member of initiation team)
1996 Co-Chair (Udo buck), Gordon Conference on Molecular and Ionic Clusters

VA. PROFESSIONAL AFFILIATIONS

American Chemical Society
American Physical Society

VB. Editorial Boards, *past and present*

Ann. Review Physical Chemistry
Journal of Physical Chemistry-A
Chemical Physics Letters
Molecular Physics

VI. DOCTORAL RESEARCH

Stanford University with Professor R. N. Zare, 1977-1983
Thesis title: "High resolution spectroscopic probes in chemical dynamics: Application to BaI and CO₂⁺"

VII. DISSERTATIONS DIRECTED

1. "Isolation and Investigation of Trapped Reaction Intermediates and the Hydrated Electron Using Negatively Charged Gas Phase Clusters," Lynmarie A. Posey, September 1989.
2. "Solvent Induced Effects in Small Homogeneous Cluster Ion Systems," Michael J. DeLuca, August, 1990.
3. "Photophysics of the excess electron on water clusters: Electron solvation at the molecular level," Paul J. Campagnola, June, 1992.
4. "Characterization of X⁻·RY S_N2 reaction intermediates," Donna M. Cyr, September, 1994.
5. "A study of photoinduced dissociative electron attachment within ion-molecule Complexes," M. Georgina Scarton, June, 1995.
6. "The caging surface for photodissociated superoxide ion in water clusters," David J. Lavrich, September, 1995.
7. "Charge transfer to solvent bands in small gas phase clusters," David Serxner, August, 1996.
8. "Vibronic effects in anion photodetachment" Christopher G. Bailey, March, 1997.
9. "Dipole-Bound Excited States of Anion-Molecule Complexes," Caroline E. H. Dessent, April, 1997.
10. "Energetics and Dynamics of the Electron Attachment Process in Anionic Clusters," Jun Kim, August, 1999.
11. "Hydrogen-bonded network morphologies of hydrated cluster anions," Patrick Ayotte, September, 1999.
12. "Infrared spectroscopy of solvated extended charge distributions," Jude A. Kelley, June, 2002.
13. "Infrared studies of H-bonding in the presence of negative ions," W. H. Robertson, Dec. 2003.
14. "Hydration of protons and electrons: A Cluster Study," Joong-Won Shin, Dec., 2004
15. "Spectroscopic determination of hydrogen bonding in anionic clusters," Erica A. Price, June, 2005.
16. "Spectroscopic investigations of fundamental chemical reactions and the cooperativity

- of hydrogen bonds in solvated clusters,” Eric G. Diken, Dec. 2005.
17. “Spectral signatures of excess proton and electron accommodation motifs in small ionic water clusters,” Jeffrey Headrick, June 2007.
 18. “Spectroscopic investigations of negatively charged molecular species pertinent to atmospheric chemistry,” Joseph Bopp, 2008.
 19. “Spectroscopic Characterization of Charge Localization and Delocalization in Ionic Clusters,” Joseph (Robert) Roscioli, 2008.
 20. “Multidimensional Infrared Spectroscopy for the Separation and Characterization of Isomer Contributions in Gas-Phase Ion Clusters” Ben Elliott, 2010
 21. “Developing a framework for proton sharing and transfer,” George Gardenier, March 2010.
 22. “Isolation and spectroscopic characterization of reactive species in atmospheric and interstellar reactions,” Rachael A. Relp, 2011.
 23. “Spectroscopic of photoinduced reactions in ionic clusters,” Timothy Guasco, 2011
 24. “Investigations of solvent/solute interactions using photoelectron and Ar-mediated ion chemistries,” Kristin Breen, 2012.
 25. “Characterizing Vibrational Anharmonicities in Infrared Spectra of Ionic Hydrogen-Bonded Complexes,” Helen Gerardi, 2012.
 26. “Development of a New Cryogenic Infrared Spectrometer for the Isolation and Characterization of Reactive Intermediates,” Michael Kamrath, 2012
 27. “Vibrational Characterization of Complexes Featuring Ionic Hydrogen Bonds,” Christopher M. Leavitt, 2013.
 28. “Cryogenic Ion Spectroscopy of Reactive Organometallic Intermediates and Non-covalent Complexes,” Arron B. Wolk, 2014.
 29. “Charge accommodation in organic motifs: using vibrational predissociation spectroscopy of cold gas phase ions to unravel structures of reactive intermediates,” Andrew Deblase, 2014.
 30. “Studies of the microscopic structures underlying the bulk properties of the hydrated proton and ionic liquids through cryogenic ion vibrational spectroscopy,” Joseph Fournier (Wolfgang Prize for best thesis)

VIII. PUBLICATIONS

1. **“Psoralen-DNA Photoreaction: Controlled Production of Mono- and Di-adducts with Nanosecond Ultraviolet Laser Pulses,”** B. H. Johnston, M. A. Johnson, C. Bradley Moore and John E. Hearst, *Science* **197**, 906 (1977).
2. **“Reinvestigation of the BaI Vibrational State Distribution in the Reaction Ba + CF₃I,”** J. Allison, M. A. Johnson and R. N. Zare, *Faraday Discussions of the Chemical Society* **67**, *Kinetics of State-Selected Species*, 124 (1979).
3. **“Rotational Analysis of Congested Spectra: Application of Population Labeling to the BaI C-X System,”** M. A. Johnson, C. R. Webster and R. N. Zare, *J. Chem. Phys.* **75**, 5575 (1981).
4. **“Optical-Optical Double Resonance on Cooled Molecular Ions: Rotational Assignments in the Perturbed CO₂⁺ B-X System,”** M. A. Johnson, J. Rostas, S. Leach and R. N. Zare, *Chem. Phys. Lett.* **92**, 225 (1982).

5. **“Resolution of the A/B Photoionization Branching Ratio Paradox for the $^{12}\text{CO}_2^+$ B(000) State,”** M. A. Johnson, J. Rostas, R. N. Zare and S. Leach, *J. Chem. Phys.* **80**, 2407 (1984).
6. **“Improved Flexibility in MODR using a Supersonic Jet Source: Applications to CO^+ and CN,”** M. A. Johnson, M. L. Alexander, I. Hertel and W. C. Lineberger, *Chem. Phys. Lett.* **105**, 374 (1984).
7. **“Rotational Analysis of the BaI $\text{C}^2\Pi - \text{X}^2\Sigma^+$ (0,0) Band,”** M. A. Johnson, C. Noda, J. S. McKillop and R. N. Zare, *Can. J. Phys.* **62**, 1467 (1984).
8. **“Photodestruction Cross-Sections for Mass-Selected Ion Clusters: $(\text{CO}_2)_n^+$,”** M. A. Johnson, M. L. Alexander and W. C. Lineberger, *Chem. Phys. Lett.* **112**, 285 (1984).
9. **“Rotational Assignment using Phase Relationships in Optical-Optical Double Resonance: The BaI $\text{C}^2\Pi - \text{X}^2\Sigma^+$ System,”** M. A. Johnson and R. N. Zare, *J. Chem. Phys.* **82**, 4449 (1985).
10. **“Photofragmentation of $(\text{CO}_2)_n^+$: Simple Energy Dependence for the Number of Neutrals Ejected, $13 \leq n \leq 26$,”** M. L. Alexander, M. A. Johnson and W. C. Lineberger, *J. Chem. Phys.* **82**, 5288 (1985).
11. **“Information on the Impact Parameter Dependence of the $\text{Ba} + \text{HI} \rightarrow \text{BaI} (\nu=8) + \text{H}$ Reaction,”** C. Noda, J. S. McKillop, M. A. Johnson, J. R. Waldeck and R. N. Zare, *J. Chem. Phys.* **85**, 856 (1986).
12. **“Demonstration of a Pulsed Photoelectron Spectrometer on Mass-Selected Cluster Ions: O^- , O_2^- , and O_4^- ,”** L. A. Posey, M. J. DeLuca and M. A. Johnson, *Chem. Phys. Lett.* **131**, 170 (1986).
13. **“Photodissociation of Mass-Selected $(\text{CO}_2)_n^-$ Clusters: Evaporation Leading to Magic Numbers in Fragment-Ion Distributions,”** M. L. Alexander, M. A. Johnson, N. E. Levinger and W. C. Lineberger, *Phys. Rev. Lett.* **57**, 976 (1986).
14. **“BaI Product State Distribution from the Reaction $\text{Ba} + \text{CH}_3\text{I}$,”** M. A. Johnson, J. Allison and R. N. Zare, *J. Chem. Phys.* **85**, 5723 (1986).
15. **“Pulsed Methods for Cluster Ion Spectroscopy,”** in *Techniques for the Study of Gas-Phase Ion Molecule Reactions*, Techniques of Chemistry, Vol. XX, Chapter XI, Page 591, (W. H. Saunders and J. M. Farrar, Eds., John Wiley & Sons, (1988), M. A. Johnson and W. C. Lineberger.
16. **“Spectroscopy of Ionic Clusters,”** W. C. Lineberger and M. A. Johnson, *National Academy of Sciences Committee on Atomic and Molecular Science*, April 1987 Symposium on Molecular and Cluster Beam Science.
17. **“Pulsed Photoelectron Spectroscopy of Negative Cluster Ions: Isolation of Three Distinguishable Forms of N_2O_2^- ,”** L. A. Posey and M. A. Johnson, *J. Chem. Phys.* **88**, 5383 (1988).

18. **“Recombination of Br_2^- Photodissociated within Mass-Selected Ionic Clusters,”** M. L. Alexander, N. E. Levinger, M. A. Johnson, D. Ray and W. C. Lineberger, *J. Chem. Phys.* **88**, 6200 (1988).
19. **“Photoelectron Spectroscopy of $(\text{CO}_2)_n^-$ Cluster with $2 \leq n \leq 13$ Cluster Size Dependence of the Core Molecular Ion,”** M. J. DeLuca, B. Niu and M. A. Johnson, *J. Chem. Phys.* **88**, 5857 (1988).
20. **“Photofragmentation of C_n^- , $4 \leq n \leq 20$: Loss of Neutral C_3 ,”** M. J. DeLuca and M. A. Johnson, *Chem. Phys. Letters* **152**, 67 (1988).
21. **“Photochemistry of Hydrated Electron Clusters $(\text{H}_2\text{O})_n^-$, ($15 \leq n \leq 40$) at 1064 nm: Size Dependent Competition between Photo-fragmentation and Photodetachment,”** L. A. Posey and M. A. Johnson, *J. Chem. Phys.* **89**, 4807 (1988).
22. **“Reactions of Hydrated Electron Clusters $(\text{H}_2\text{O})_n^-$: Scavenging the Excess Electron,”** L. A. Posey, M. J. DeLuca, P. J. Campagnola and M. A. Johnson, *J. Phys. Chem.* **93**, 1178 (1989).
23. **“On the Origin of the Competition Between Photofragmentation and Photodetachment in Hydrated Electron Clusters, $(\text{H}_2\text{O})_n^-$,”** L. A. Posey, P. J. Campagnola, M. A. Johnson, G. H. Lee, J. G. Eaton and K. H. Bowen, *J. Chem. Phys.* **91**, 6536 (1989).
24. **“Observation of a UV Absorption Band in Ar_3^+ Near 300 nm,”** M. J. DeLuca and M. A. Johnson, *Chem. Phys. Lett.* **162**, 445 (1989).
25. **“Preservation of Rotational Cooling Following Pulse Compression TOF Mass Selection of N_2O^+ Ions Created in a Supersonic Plasma,”** M. J. DeLuca and M. A. Johnson, *Chem. Phys. Lett.* **162**, 255 (1989).
26. **“Photoabsorption of Negative Cluster Ions Near the Electron Detachment Threshold: A Study of $(\text{O}_2)_n^-$ System,”** M. J. DeLuca, C. C. Han, M. A. Johnson, *J. Chem. Phys.*, **93**, 268 (1990).
27. **“Angular Distribution of the Photoejected Electrons from $(\text{H}_2\text{O})_{18}^-$,”** P. J. Campagnola, L.A. Posey, and M. A. Johnson, *J. Chem. Phys.* **92**, 3243 (1990).
28. **“Isotopic Fractionation in Low Temperature Ion-Molecule Exchange Reactions: Enrichment of ^{22}Ne in Ne_n^+ Clusters formed by Association Reactions in an Ionized Free Jet,”** M. J. DeLuca, D. M. Cyr, W. A. Chupka, and M. A. Johnson *J. Chem. Phys.* **92**, 7349 (1990).
29. **“Photodestruction Spectra of the Anionic Water Clusters, $(\text{H}_2\text{O})_n^-$, $n=18$ and 30 : Absorption to the Red of e_{aq}^- ,”** P. J. Campagnola, D. J. Lavrich, M. J. DeLuca, and M. A. Johnson, *J. Chem. Phys.* **94**, 5240 (1991).

30. **“Size dependent collisional incorporation of D₂O in to (H₂O)_n⁻ around n=15: implications on the origin of magic numbers in the hydrated electron cluster clusters distribution,”** P. J. Campagnola, D. M. Cyr, and M. A. Johnson, *Chem. Phys. Letters* **181**, 206 (1991).
31. **“Collisional activation of captured intermediates in the gas-phase S_N2 reaction Cl⁻ + CH₃Br → Br⁻ + CH₃Cl,”** D. M. Cyr, L. A. Posey, G. A. Bishea, C. -C. Han and M. A. Johnson, *J. Amer. Chem. Soc. (Communication)* **113**, 9699 (1991).
32. **“Controlling the internal energy content of size-selected cluster ions: An experimental comparison of the metastable decay rate and photofragmentation methods of quantifying the internal excitation of (H₂O)_n⁻,”** P. J. Campagnola, L. A. Posey, and M. A. Johnson, *J. Chem. Phys.* **95**, 7998 (1991).
33. **“Bound-bound and bound-free contributions to the absorption spectrum of (H₂O)₃₀⁻,”** P. J. Campagnola, D. J. Lavrich, and M. A. Johnson, *J. De Physique IV*, C5-93 (1991).
34. **“Nascent Vibrational Distribution of the O₂⁻(ν) Fragment Following Photofragmentation of Size-Selected (O₂)_n⁻ Clusters,”** C.-C. Han and M. A. Johnson, *Chem. Phys. Letters* **189**, 460 (1992).
35. **“Photoinduced intra-cluster electron transfer reactions of captured intermediates in gas phase S_N2 reactions,”** D. M. Cyr, G. A. Bishea, C.-C. Han, L. A. Posey, and M. A. Johnson, *Optical methods for time- and state-resolved chemistry*, SPIE vol **1638**, 74 (1992).
36. **“Observation of charge transfer excited states in the S_N2 ion-molecule reaction intermediates: I⁻·CH₃I and I⁻·CH₂Br₂,”** D. M. Cyr, G. A. Bishea, M. G. Scarton, and M. A. Johnson, *J. Chem. Phys.* **97**, 5911 (1992).
37. **“Photofragmentation of anionic reaction intermediates formed upon electron attachment to 2-chloroacrylonitrile clusters: Evidence for polymer degradation in the cluster regime,”** T. Tsukuda, A. Terasaki, T. Kondow, M. G. Scarton, C. E. H. Dessent, G. A. Bishea and M. A. Johnson, *Chem. Phys. Letters* **201**, 351 (1993).
38. **“Observation of the A ²Π_u → X ²Π_g dissociative transition in isolated O₂⁻ using mass-selected photofragmentation spectroscopy,”** D. J. Lavrich, M. A. Buntine, D. Serxner, M. A. Johnson, *J. Chem. Physics*, **99**, 5910 (1993).
39. **“Photoelectron spectroscopy of the gas-phase S_N2 reaction intermediates, I⁻·CH₃I and I⁻·CD₃I: Distortion of the CH₃I at the ‘ion-dipole’ complex,”** D. M. Cyr, M. G. Scarton, M. A. Johnson, *J. Chem. Phys.*, **99**, 4869 (1993).
40. **“Magic numbers and geminate recombination dynamics of anions in water clusters,”** D. J. Lavrich, D. M. Cyr, M.A. Buntine, C.E. Dessent, L. A. Posey, and M.A. Johnson, *Proceedings of the 26th Jerusalem Symposium*, June 14, 1993.

41. **“Photoinitiation of the $\text{O}^- + \text{H}_2\text{O} \rightarrow \text{OH}^- + \text{OH}$ ion-molecule reaction within the $\text{O}_2^- \cdot \text{H}_2\text{O}$ binary complex,”** M. A. Buntine, D. J. Lavrich, C. E. Dessent, M. G. Scarton, and M. A. Johnson, *Chem. Phys. Letters*, **216**, 471 (1993).
42. **“Photoinduced dissociative electron capture processes in binary ion-molecule complexes,”** D. M. Cyr, Mark A. Johnson, *Nato ASI Ser., Ser. B*, **326**, 397-414 (1994).
43. **“Photofragmentation as a probe of electron thermalization in size-selected cluster anions,”** D. J. Lavrich, P. J. Campagnola, M.A. Johnson, *Nato ASI Ser., Ser. B*, **326**, 183-202 (1994).
44. **“The charge transfer excited state of the $\text{I}^- \cdot \text{CH}_3\text{I}$ $\text{S}_{\text{N}}2$ reaction intermediate: Photoinduced, intra-cluster dissociative attachment,”** D. M. Cyr, C. G. Bailey, D. Serxner, M. G. Scarton, M.A. Johnson, *J. Chem. Phys.* **101**, 10507 (1994).
45. **“Observation of the XY^- abstraction products in the ion-molecule reactions $\text{X}^- + \text{RY} \rightarrow \text{XY}^- + \text{R}\cdot$: Competition with the $\text{S}_{\text{N}}2$ mechanism at supra-thermal collision energies,”** D. M. Cyr, M. G. Scarton, K. B. Wiberg, M.A. Johnson,, J. Hirokawa, H. Tanaka, T. Kondow, R. A. Morris, A.A. Viggiano, *J. Amer. Chem. Soc.* **117**, 1828 (1995).
46. **“Vibronic structure of the CO_2^+ ion: Reinvestigation of the antisymmetric vibration in the X, A, and B states,”** M. A. Johnson and J. Rostas, *Molecular Physics*, **85**, 839 (1995).
47. **“Negative Ion Zero Electron Kinetic Energy (ZEKE) Spectroscopy of $\text{I}^- \cdot \text{CH}_3\text{I}$,”** Cine C. Arnold, D. M. Neumark, D. M. Cyr, M. A. Johnson, *J. Phys. Chem.* **99**, 1633, (1995).
48. **“Characterization of the 2-chloroacrylonitrile negative ion using photoelectron and photofragmentation spectroscopies,”** M. Ichihashi, J. Hirokawa, T. Tsukuda, T. Kondow, C.E.H. Dessent, C.G. Bailey, M.G. Scarton, and M.A. Johnson, *J. Phys. Chem.*, **99**, 1655 (1995).
49. **“Observation of the dipole-bound excited state of the $\text{I}^- \cdot (\text{acetone})$ ion-molecule complex,”** C. E. H. Dessent, C. G. Bailey, M.A. Johnson, *J. Chem. Phys.* **102**, 6335 (1995).
50. **“Excess energy-dependent photodissociation probabilities for O_2^- in water clusters: $\text{O}_2^- \cdot (\text{H}_2\text{O})_n$, $1 \leq n \leq 33$,”** D. J. Lavrich, M. A. Buntine, D. Serxner, M A. Johnson, *J. Phys. Chem.* **99**, 8453 (1995).
51. **“Dipole-bound excited states of the $\text{I}^- \cdot (\text{CH}_3\text{CN})_n$, ($n = 1$ and 2) ion-molecule complexes: Evidence for asymmetric solvation,”** C. E. H. Dessent, C. G. Bailey, M. A. Johnson, *J. Chem. Phys.* **103**, 2006 (1995).
52. **“Photoinitiation of the anionic condensation reaction in 2-chloroacrylonitrile via the charge-transfer bands of the $\text{Cl}^- \cdot (\text{2-chloroacrylonitrile})_{1,2}$ clusters,”** C. E. H. Dessent, C. G. Bailey, and M. A. Johnson, *Chem. Phys. Letters*, **244**, 127 (1995).

53. **“Evidence for the high-energy (collinear) van der Waals isomer of the acetonitrile dimer,”** C. E. H. Dessent, J. Kim, and M. A. Johnson, *J. Phys. Chem.* **100**, 12, (1996).
54. **“Thermal energy reactions of size-selected hydrated electron clusters $(\text{H}_2\text{O})_n^-$,”** S. T. Arnold, R. A. Morris, A. A. Viggiano, and M. A. Johnson, *J. Phys. Chem.* **100**, 2900 (1996).
55. **“Vibronic effects in the photon energy-dependent photoelectron spectra of the CH_3CN^- dipole-bound anion,”** K. H. Bowen, C. G. Bailey, C. E. H. Dessent, and M. A. Johnson, *J. Chem. Phys.*, **104**, 6976 (1996).
56. **“Evidence for asymmetric solvation in ion-molecule clusters from dipole-bound excited state spectroscopy,”** C. E. H. Dessent, C. G. Bailey, and M. A. Johnson, *Proc. Yamada Conference XLIII, Structures and Dynamics of Clusters*, (Publ. Universal Academy Press, Inc., Tokyo, 1996).
57. **“Observation of autodetaching vibrational resonances in the $\text{O}_2^- \text{A}^2\Pi_u$ state across the dissociation limit by photoexcitation of the $\text{O}_2^- \text{A}^2\Pi_u - \text{X}^2\Pi_g$ transition,”** D. J. Lavrich, D. Serxner, C. G. Bailey, and M. A. Johnson, *J. Chem. Phys.* **105**, 1807 (1996).
58. **“Precursor of the I_{aq}^- charge-transfer-to-solvent (CTTS) bands in $\text{I}^- \cdot (\text{H}_2\text{O})_n$ clusters”** D. Serxner, C. E. H. Dessent and M. A. Johnson, *J. Chem. Phys.* **105**, 7231 (1996).
59. **“Infrared spectroscopy of the hydrated electron clusters, $(\text{H}_2\text{O})_n^-$: $n=6,7$: Evidence for hydrogen bonding to the excess electron”** C. G. Bailey, J. Kim, and M. A. Johnson, *J. Phys. Chem.* **100**, 16782 (1996).
60. **“Fundamentals of negative ion photoelectron spectroscopy,”** C. E. H. Dessent and M. A. Johnson in *Fundamentals and Applications of Gas Phase Ion Chemistry* (K. R. Jennings, Editor) NATO ASI C521, 287 (1999).
61. **“Characterization of the anionic intracuster polymerization reaction product of 2-chloroacrylonitrile trimers by photoelectron spectroscopy,”** T. Tsukuda, T. Kondo C.E.H. Dessent, C. G. Bailey, M. A. Johnson, J. H. Hendricks, S. A. Lyapustina, and K. H. Bowen, *Chem. Phys. Letters*, **269** 17 (1997).
62. **“On the vibrational fine structure in the near-threshold photofragmentation spectrum of the $\text{I}^- \cdot \text{CH}_3\text{I}$ complex: Spectroscopic observation of non-adiabatic effects in electron-molecule scattering,”** C.E.H. Dessent, C. G. Bailey, and M.A. Johnson, *J. Chem. Phys.* **105**, 10416 (1996).
63. **“Determination of the relative photodetachment cross sections and photoelectron spectra of the two isomers of $(\text{H}_2\text{O})_n^-$ using saturated photodetachment,”** C. G. Bailey and M. A. Johnson, *Chem. Phys. Letters*, **265** 185 (1997).
64. **“Electronic absorption spectra of size-selected hydrated electron clusters, $(\text{H}_2\text{O})_n^-$, $n=6$ -**

- 50." P. Ayotte and M. A. Johnson, *J. Chem. Phys.*, **106**, 811 (1997).
65. **"Vibrational predissociation spectra of $I^- \cdot H_2O$: Isotopic labels and weakly bound complexes with Ar and N_2 ,"** C. G. Bailey, J. Kim, C. E. H. Dessent, and M.A. Johnson, *Chem. Phys. Letters*, **269**, 122 (1997).
66. **"Photoelectron spectroscopy of $(CO_2)_n^-$ revisited: Core switching in the $2 \leq n \leq 16$ range,"** T. Tsukuda, M.A. Johnson, T. Nagata, *Chem. Phys. Letters*, **268**, 429 (1997).
67. **"Photoinitiation of the gas phase $X^- + CH_3NO_2 \rightarrow NO_2^- + CH_3X$ ($X=Cl, Br, I$) Reactions through the Evans-Polanyi excited state surface,"** C. E. H. Dessent, M. A. Johnson, *J. Amer. Chem. Soc. Communication*, **119** 5067 (1997).
68. **"Vibrational predissociation spectroscopy of the $(H_2O)_6^- \cdot Ar_m$ clusters,"** P. Ayotte, J. Kim, C. G. Bailey, M. A. Johnson, *J. Chem. Phys.* **102**, 444 (1998).
69. **"Photochemistry of halide ion-molecule clusters: Dipole bound excited states and the case for asymmetric solvation,"** C. E. H. Dessent, J Kim, M. A. Johnson, *Accounts of Chemical Research*, **31**, 527 (1998).
70. **"Vibrational spectroscopy of small $Br^- \cdot (H_2O)_n$ and $I^- \cdot (H_2O)_n$ clusters: Infrared characterization of the ionic hydrogen bond,"** P. Ayotte, C G. Bailey, M.A. Johnson, *J. Phys. Chem. A*, **102**, 3067 (1998).
71. **"Charge-Transfer Processes in Clusters,"** Israela Becker, O. Cheshnovsky, C. Dessent, M. A. Johnson, *Adv. Chem. Phys.* (1999).
72. **"Photoelectron spectroscopy of the "missing" hydrated electron clusters, $(H_2O)_n^-$, $n=3,5,8$ and 9 : Isomers and continuity with the dominant clusters $n=6, 7$ and 11 ,"** J. Kim, I. Becker, O. Cheshnovsky, M. A. Johnson, *Chem. Phys. Letters*, **297**, 90 (1998).
73. **"Mass-selected 'matrix isolation' infrared spectroscopy of the $I^- \cdot (H_2O)_2$ complex: Making and breaking the inter-water hydrogen bond,"** P. Ayotte, G.H. Weddle, J. Kim, M.A. Johnson, *Chemical Physics*, **239**, 485 (1998).
74. **"Vibrational spectroscopy of the ionic hydrogen bond: Fermi resonances and ion-molecule stretching frequencies in the $X^- \cdot W$ ($X=Cl, Br, I$) clusters via argon predissociation spectroscopy,"** P. Ayotte, G. H. Weddle, J Kim, M.A. Johnson, *J. Am. Chem. Soc. Communication* **120**, 12,361 (1998).
75. **"Infrared characterization of the negatively charged water clusters, $(H_2O)_n^-$, $5 \leq n \leq 11$: Evidence for linear structures,"** P. Ayotte, G. H. Weddle, F. Vila, K. D. Jordan, M. A. Johnson, *J. Chem. Phys.* **110**, 6268 (1999).
76. **"A cluster study of anionic hydration: Spectroscopic characterization of the $I^- \cdot W_n$, $1 \leq$**

- $n \leq 3$, supramolecular complexes at the primary steps of solvation,”** P. Ayotte, G. H. Weddle, J. Kim, J. Kelley, M. A. Johnson, , *J. Phys. Chem. A (Letter)*, **103**, 443 (1999).
77. **“An infrared study of the competition between hydrogen-bond networking and ionic solvation: Halide-dependent distortions of the water trimer in the $X^- \cdot (H_2O)_3$, ($X=Cl, Br, I$) systems,”** P. Ayotte, G. H. Weddle, M. A. Johnson, *J. Chem. Phys. (Communication)*, **110**, 7129 (1999).
78. **“Preparation and photoelectron spectrum of the CH_3I^- anion: A rare gas mediated synthesis of an ion-radical complex,”** J. Kim, J. A. Kelley, S. Nielsen, P. Ayotte, G. H. Weddle, M. A. Johnson, *J. Am. Soc. Mass Spectrom.*, **810** (1999).
79. **“Photoactivation of the $Cl^- + CH_3Br$ S_N2 reaction by via rotationally resolved C-H stretch excitation of the $Cl^- \cdot CH_3Br$ entrance channel complex,”** P. Ayotte, J. Kim, J. A. Kelley, M. A. Johnson, *J. Am. Chem. Soc. (Communication)*, **121**, 6950 (1999).
80. **“Infrared Spectra of Hydrogen-Bonded Ion-Radical Complexes: $I^- \cdot HCH_2$ and $Br^- \cdot HCHBr$,”** S. B. Nielsen, P. Ayotte, J. A. Kelley, G. H. Weddle, M. A. Johnson, *J. Chem. Phys.* **111**, 10464 (1999).
81. **“Infrared Spectroscopic Observation of the Argon Isomer Distribution in Evaporative Ensembles of $I^- \cdot ROH (Ar)_m$, ($R = methyl, ethyl, isopropyl$) Clusters,”** S. B. Nielsen, P. Ayotte, J. A. Kelley, M. A. Johnson, *J. Chem. Phys.*, **111**, 9593 (1999).
82. **“Spectroscopic observation of ion-induced water dimer dissociation in the $X^- \cdot (H_2O)_2$ ($X = F, Cl, Br, I$) Clusters,”** P. Ayotte, S. B. Nielsen, G. H. Weddle, M. A. Johnson, *J. Phys. Chem. A (Letter)* **103**, 10,665-10,669 (1999).
83. **“Infrared predissociation spectroscopy of the $F^- \cdot H_2O Ar_n$ ($n=1-3$) complexes: Optically driven intracluster proton transfer?,”** P. Ayotte, S. B. Nielsen, J. A. Kelley, M. A. Johnson, *Chem. Phys. Letters* **316**, 453-457 (2000).
84. **“Spectroscopic observation of vibrational Feshbach resonances in near-threshold photoexcitation of $X^- \cdot CH_3NO_2$ ($X = I$ and Br),”** C. E. H. Dessent, J. Kim, M. A. Johnson, *Faraday Discussion* **115**, 395-406 (2000).
85. **“Isolating the spectroscopic signature of a hydration shell using clusters: Superoxide tetrahydrate,”** J. M. Weber, S. B. Nielsen, P. Ayotte, J. A. Kelley, M. A. Johnson, *Science* **287** 2461, (2000)
86. **“The infrared predissociation spectra of $Cl^- \cdot H_2O \cdot Ar_n$ ($n=1-5$): Experimental determination of the influence of Ar_n ,”** J. A. Kelley, J. M. Weber, K. M. Lisle, W. H. Robertson, P. Ayotte, and M. A. Johnson, *Chem. Phys. Letters*, **327**, 1-6 (2000).

87. **“Double-contact ion-molecule binding: Infrared characterization of the ionic H-bonds to formic acid in the $\text{I}^- \cdot \text{HCOOH} \cdot \text{Ar}_m$ complex,”** W. H. Robertson, J. A. Kelley, K. M. Lisle, and M. A. Johnson, *J. Chem. Phys.*, **113**, 7879-7884 (2000).
88. **“Dipole bound and valence state coupling in argon-solvated nitromethane anions,”** F. Lecompte, S. Carles, C. Desfrancois, and M. A. Johnson, *J. Chem. Phys.* **113**, 10973-10977 (2000).
89. **“A pulsed supersonic entrainment reactor for the rational preparation of cold ion-molecule complexes,”** W. H. Robertson, J. A. Kelley, and M. A. Johnson, *Rev. Sci. Instrum.* **71**, 4431-4433 (2000).
90. **“Hydration of a structured excess charge distribution: Infrared spectroscopy of the $\text{O}_2^- \cdot (\text{H}_2\text{O})_n$, ($1 \leq n \leq 5$) clusters,”** J. M. Weber, J. A. Kelley, W. H. Robertson, M. A. Johnson, *J. Chem. Phys.* **114**, 2698 (2001).
91. **“Observation of resonant two-photon photodetachment of water cluster anions via femtosecond photoelectron spectroscopy,”** J. M. Weber, J. Kim, E. A. Woronowicz, I. Becker, O. Cheshnovsky, M. A. Johnson, *Chem. Phys. Letters*, **339**, 337-342 (2001).
92. **“Linking the photoelectron and infrared spectroscopies of the $(\text{H}_2\text{O})_6^-$ isomers,”** J. A. Kelley, G. H. Weddle, W. H. Robertson, M. A. Johnson, *J. Chem. Phys.* **116**, 1201 (2001).
93. **“Argon predissociation and electron autodetachment spectroscopy of size-selected $\text{CH}_3\text{NO}_2^- \cdot \text{Ar}_n$ clusters,”** J. M. Weber, W. H. Robertson, M. A. Johnson, *J. Chem. Phys.* **115**, 10718 (2001).
94. **“Solvation of the $\text{Cl}^- \cdot \text{H}_2\text{O}$ complex in CCl_4 clusters: The effect of solvent-mediated charged redistribution on the ionic H-bond,”** W. H. Robertson, G. H. Weddle, J. A. Kelley, M. A. Johnson, *J. Phys. Chem. A*, **106**, 1205 (2002).
95. **“Infrared predissociation spectroscopy of $\text{I}^- \cdot (\text{CH}_3\text{OH})_n$, $n=1,2$: Cooperativity in asymmetric solvation,”** W. H. Robertson, K. Karapetian, P. Ayotte, K. D. Jordan, and M. A. Johnson, *J. Chem. Phys.* **116**, (2002).
96. **“Infrared characterization of the icosahedral shell closing in $\text{Cl}^- \cdot \text{H}_2\text{O} \text{ Ar}_n$ ($1 \leq n \leq 13$) clusters,”** S. A. Corcelli, J. A. Kelley, J. C. Tully, and M. A. Johnson, (Cover art) *J. Phys. Chem. A*, **106**, 4872-4879 (2002).
97. **“Vibrational Predissociation Spectroscopy,”** in *Encyclopedia of Mass Spectrometry, Vol. 5: Theory and Ion Chemistry*, P. Amentrout Ed., (2002).
98. **“Isolating of the charge-transfer component of the anionic H-bond via spin suppression of the proton transfer reaction in the $\text{NO}^- \cdot \text{H}_2\text{O}$ complex,”** W. H. Robertson, Y. Myshakin, K. D. Jordan, and M. A. Johnson, *J. Phys. Chem. A*, **106**, 10010-10014 (2002).

99. **“Observation of sharp vibronic bands in the O_4^- “core ion” by mid infrared predissociationspectroscopy of $\text{O}_4^- \cdot \text{Ar}_n$ clusters,”** J.A. Kelley, W. H. Robertson and M. A. Johnson, *Chem. Phys. Letters*, **362**, 255-260 (2002).
100. **“Infrared spectroscopic characterization of the symmetrical hydration motif in the $\text{SO}_2^- \cdot \text{H}_2\text{O}$ complex,”** Y. Myshaken, K. D. Jordan, E. A. Woronowicz, W. H. Robertson, G. H. Weddle, and M. A. Johnson, *J. Phys. Chem. A. (Letter)* **106**, 4872-4879 (2002).
101. **“Mass spectrometry and van der Waals clusters: Meeting the challenge of size selection in the nanosolvation regime”** (Editorial) *Int. J. Mass Spectr.* **220**, 97 (2002).
102. **“Caught in the act of dissolution,”** W. H. Robertson, M. A. Johnson, (Invited perspective) *Science*, **298**, 69 (2002).
103. **“Argon predissociation infrared spectroscopy of the hydroxide water complex ($\text{OH}^- \cdot \text{H}_2\text{O}$),”** E. A. Price, W. H. Robertson, M. A. Johnson, *Chem. Phys. Letters*, **366**, 412-416 (2002).
104. **“Dominant structural motifs in $\text{NO}^- \cdot (\text{H}_2\text{O})_n$: Infrared spectroscopic and ab initio studies,”** E. M. Myshakin, K. D. Jordan, W. H. Robertson, G. H. Weddle, M. A. Johnson, *J. Chem. Phys.* **118**, 4945-4953, (2003).
105. **“Molecular aspects of halide ion hydration: The cluster approach,”** W. H. Robertson and M. A. Johnson, *Ann. Rev. Phys. Chem.*, **54**, 173-213 (2003).
106. **“Spectroscopic Determination of the OH^- Solvation Shell in the $\text{OH}^- (\text{H}_2\text{O})_n$ Clusters,”** W.H. Robertson, E. G. Diken, E. A. Price, Joong-Won Shin, and Mark A. Johnson, *Science* **299**, 1367-1372 (2003).
107. **“Infrared signatures of a water molecule attached to triatomic domains of molecular anions: Evolution of the H-bonding configuration with domain length and vibrationally adiabatic Effects,”** W. H. Robertson, E. A. Price, J. M. Weber, and M. A. Johnson, *J. Phys. Chem. A.*, (cover art) **107**, 6527-6532 (2003).
108. **“Large Anharmonic Effects in the Infrared Spectra of the Symmetrical $\text{CH}_3\text{NO}_2^- \cdot (\text{H}_2\text{O})$ and $\text{CH}_3\text{CO}_2^- \cdot (\text{H}_2\text{O})$ Complexes,”** E.M. Myshakin, K.D. Jordan, E.L. Sibert III, and M. A. Johnson, *J. Chem. Phys.*, **119**, 10138-10145 (2003).
109. **“Strong similarities in the local hydration environments of the bromide ion and the $\text{Cl}^- \cdot \text{CCl}_3^-$ ion-radical complex: Factors contributing to intramolecular distortions in the primary hydration shell, ”** W. H. Robertson, G. H. Weddle, M. A. Johnson, *Journal of Physical Chemistry A*, **107**, 9312-9318 (2003).
110. **“Snapshots of water at work,”** W. H. Robertson, E. G. Diken and M. A. Johnson, *Science* (Invited Perspective), **301**, 320-321 (2003).

111. **"The vibrational spectrum of the neutral (H₂O)₆ precursor to the "magic" (H₂O)₆⁻ cluster anion by argon-mediated, population-modulated electron attachment spectroscopy"** E. G. Diken, W. H. Robertson, M. A. Johnson, *J. Phys. Chem. A*, **108**, 64-68, (2004).
112. **"A cluster study of Cl₂⁻ microhydration: Size-dependent competition between symmetrical H-bonding to the anion and the formation of cyclic water networks in the Cl₂⁻·1-5(H₂O) series,"** E. A. Price, N. I. Hammer, M. A. Johnson, *Journal of Physical Chemistry A*, **108**, 3910-3915, (2004).
113. **"Isotopic Fractionation and Zero-Point Effects in Anionic H-Bonded Complexes: A Comparison of the I⁻·HDO and F⁻·HDO Ion-Molecule Clusters,"** E. G. Diken, J.-W. Shin, E. A. Price, and M. A. Johnson, *Chem. Phys. Lett.*, **387**, 17-22, (2004).
114. **"Infrared signature of structures associated with the H⁺(H₂O)_n, n = 6-27, clusters."** J.-W. Shin, N. I. Hammer, E. G. Diken, M.A. Johnson, R. S. Walters, T. D. Jaeger, M. A. Duncan, R. A. Christie, and K. D. Jordan, *Science*, **304**, 1137-1140, (2004).
115. **"Preparation and photoelectron spectrum of the glycine molecular anion: Assignment to a dipole-bound electron species with a high-dipole moment, non-zwitterionic form of the neutral core."** E. G. Diken, N. I. Hammer, M. A. Johnson, *J. Chem. Phys.*, **120**, 9899-9902, (2004).
116. **"Preparation and photoelectron spectrum of the "missing" (H₂O)₄⁻ cluster,"** J-W Shin, N I. Hammer, J M. Headrick, M. A. Johnson, *J. Chem. Phys. Letters*, **399**, 349-353, (2004).
117. **"Argon cluster-mediated trapping and vibrational spectroscopic characterization of an OH⁻·HCH₂[·] intermediate in the O⁻ + CH₄ reaction,"** E. G. Diken, G. H. Weddle, J. M. Headrick, J. M. Weber, M. A. Johnson, *J. Phys. Chem. A*, **108**, 10116 (2004).
118. **"How do small water clusters bind an excess electron?"** N. I. Hammer, J-W Shin, J. Headrick, E. G. Diken, J. R. Roscioli, G. H. Weddle, M. A. Johnson *Science*, **306**, 675-679, (2004). (SciencExpress)
119. **"Predissociation spectroscopy of the argon-solvated H₅O₂⁺ "Zundel" cation in the 1000 - 1900 cm⁻¹ region."** J. M. Headrick, J. C. Bopp, M. A. Johnson, *J. Chem. Phys. Communication*, **121**, 11523-11526, (2004).
120. **"Role of Water in Electron-Initiated Processes and Radical Chemistry: Issues and Scientific Advances,"** B. C. Garrett, D. A. Dixon, D. M. Camaioni, D. M. Chipman, M. A. Johnson, C. D. Jonah, G. A. Kimmel, J.H. Miller, T. N. Rescigno, P. J. Rossky, S. S. Xantheas, S. D. Colson, A. H. Laufer, D. Ray, P. F. Barbara, D. M. Bartels, K. H. Becker, K. H. Bowen, Jr., S. E. Bradforth, I. Carmichael, J.V. Coe, L. R. Corrales, J. P. Cowin, M. Dupuis, K. B. Eisenthal, J.A. Franz, M. S. Gutowski, K. D. Jordan, B.D. Kay, J. A. LaVerne, S. V. Lyman, T. E. Madey, C. W. McCurdy, D. Meisel, S. Mukamel, A. R. Nilsson, T.M. Orlando, N. G. Petrik, S.M. Pimblott, J. R. Rustad, G. K. Schenter, S. J.

- Singer, A. Tokmakoff, L-S Wang, C Wittig, T. S. Zwier, *Chem. Rev.*, **105**, 355-390, (2005).
121. **"Argon predissociation spectroscopy of the OH·H₂O and Cl·H₂O complexes in the 1000 - 1900 cm⁻¹ region: Intramolecular bending transitions and the search for the shared proton fundamental in the hydroxide monohydrate."** E. G. Diken, J. M. Headrick, J.R. Roscioli, J.C. Bopp, M.A. Johnson, A. B. McCoy, X. Huang, S. Carter, J.M. Bowman, *J. Phys. Chem. A* **109**, 571-575, (2005).
 122. **"An infrared investigation of the (CO₂)_n⁻ clusters: Core ion switching from both the ion and solven perspectives."** J-W. Shin, N.I. Hammer, M.A. Johnson, H. Schneider, A. Glob, and J.M. Weber, *J. Phys. Chem. A*, **109**, 3146-3152, (2005).
 123. **"Fundamental excitations of the shared proton in the H₃O₂⁻ and H₅O₂⁺ complexes."** E.G. Diken, J. M. Headrick, J.R. Roscioli, J.C. Bopp, M.A. Johnson, A.B. McCoy *J. Phys. Chem. A*, **109**, 1487-1490, (2005).
 124. **"Spectral signatures of hydrated proton vibrations in water clusters."** J.M. Headrick, E.G. Diken, R.S. Walters, N.I. Hammer, R.A. Christie, J. Cui, E.M. Myshakin, M.A. Duncan, M.A. Johnson, and K.D. Jordan, *Science*, **308**, 1765-1769, (2005).
 125. **"The vibrational predissociation spectra of the H₅O₂⁺· RG_n (RG = Ar, Ne) clusters: Correlation of the solvent perturbations in the free OH and shared proton transitions of the Zundelion."** N.I. Hammer, E.G. Diken, J.R. Roscioli, E.M. Myshakin, K.D. Jordan, A.B. McCoy, X. Huang, S. Carter, J.M. Bowman, and M.A. Johnson, *J. Chem. Phys.*, **122**, 244301, (2005).
 126. **"Photoelectron spectroscopy of the [Glycine· (H₂O)_{1,2}]⁻ clusters: Sequential hydration shifts and observation of isomers,"** E. G. Diken, J.M. Headrick, M.. A. Johnson, *J. Chem. Phys.*, **122**, 224317-1-6, (2005).
 127. **"Identification of two distinct electron binding motifs in the anionic water clusters: A vibrational spectroscopic study of the (H₂O)₆⁻ isomers,"** N.I. Hammer, J.R. Roscioli, M.A. Johnson, *J. Phys. Chem. A*, **109** 7896 (2005).
 128. **"Infrared spectrum and structural assignment of the water trimer anion,"** N.I. Hammer, J.R. Roscioli, M.A. Johnson, E.M. Myshakin, K.D. Jordan *J. Phys. Chem. A*, **109**, 11526-11530, (2005).
 129. **"Vibrational predissociation spectroscopy of the (H₂O)₆₋₂₁⁻ clusters in the OH stretching region: Evolution of the excess electron binding signature into the intermediate cluster size regime,"** N. I. Hammer, J. R. Roscioli, J.C. Bopp, J. M. Headrick, M.A. Johnson, *J. Chem. Phys.*, **123**, 244311, (2005).
 130. **"Mid infrared characterization of the NH₄⁺· (H₂O)_n clusters in the neighborhood of the n = 20 magic number,"** E.G. Diken, N.I. Hammer, M.A. Johnson, R.A. Christie, K.D. Jordan *J. Chem. Phys.*, **123**, 164309-164315 (2005).

131. **"Determination of the CO_3^- Bond Strength via the Resonant Two-Photon Photodissociation Threshold: Electronic and Vibrational Spectroscopy of $\text{CO}_3^- \cdot \text{Ar}_n$ "** J. C. Bopp, E.G. Diken, J. M. Headrick, J.R. Roscioli, M. A. Johnson, A.J. Midey, A. A. Viggiano, *J. Chem. Phys.*, **124**, 174302, (2006).
132. **"Infrared spectroscopy of water cluster anions, $(\text{H}_2\text{O})_{n=3-24}^-$ in the HOH bending region: Persistence of the double H-bond acceptor (AA) water molecule in the excess electron binding site of the class I isomers"** J.R. Roscioli, N.I. Hammer, M. A. Johnson, *J. Phys. Chem. A*, **110**, 7517, (2006).
133. **"Prying apart a water molecule with anionic H-bonding: A comparative spectroscopic study of the $\text{X} \cdot \text{H}_2\text{O}$ ($\text{X} = \text{OH}, \text{O}, \text{F}, \text{Cl},$ and Br) binary complexes in the 600 - 3800 cm^{-1} region"** (Cover Art) J. R. Roscioli, E.G. Diken, A. McCoy, Mark A. Johnson, *J. Phys. Chem. A*, **110**, 4943-4952, (2006). (Feature Article, Cover Article)
134. **"Isomer-specific spectroscopy of the $(\text{H}_2\text{O})_8^-$ cluster anion in the intramolecular bending region by selective photodepletion of the more weakly electron binding species (isomer II)"** J.R. Roscioli, M. A. Johnson, *J. Chem. Phys.*, **126**, 024307, (2007).
135. **"Spectroscopic characterization of the isolated SF_6^- and C_4F_8^- anions: Observation of very long harmonic progressions in symmetric deformation modes upon photodetachment"**
Joseph C. Bopp, J. R. Roscioli, M. A. Johnson, T. M. Miller, A. A. Viggiano, S. M. Villano, S. W. Wren, W. C. Lineberger, *J. Phys. Chem. A*, **111**, 1214-1221, (2007).
136. **"Gas-Phase Infrared Spectroscopy and Multidimensional Quantum Calculations of the Protonated Ammonia Dimer N_2H_7^+ "**, K. R. Asmis, Y. Yang, G. Santambrogio, M. Brümmer, J. R. Roscioli, L. R. McCunn, M. A. Johnson, O. Kühn, *Angewandte Chemie Int. Ed.*, **46**, 8691-8694, (2007).
137. **"Theoretical and infrared spectroscopic investigation of the $\text{O}_2^- \cdot \text{benzene}$ and $\text{O}_4^- \cdot \text{benzene}$ complexes,"** H. Schneider, J. M. Weber, E. M. Myshakin, K. D. Jordan, J. Bopp, T. Herden, M. A. Johnson, *J. Chem. Phys.*, **127**, 084319 (2007).
138. **"Kinetics for the Reactions of O^- and O_2^- with $\text{O}_2(a^1\Delta_g)$ Measured in a Selected Ion Flow Tube at 300 K,"** A. Midey, I. Dotan, S. Lee, W. T. Rawlins, M.A. Johnson, A. A. Viggiano, *J. Phys. Chem. A*, **111**, 5218 (2007).
139. **"Infrared Multiple Photon Dissociation of the Hydrated Electron Clusters $(\text{H}_2\text{O})_{15-50}^-$ "**
K. R. Asmis, G. Santambrogio, J. Zhou, E. Garand, J. Headrick, D. Goebbert, M. A. Johnson, D. M. Neumark, *J. Chem. Phys.*, **126**, 191105 (2007).
140. **"Quantum structure of the intermolecular proton bond,"** J. R. Roscioli, L. R. McCunn, M. A. Johnson, *Science*, **316**, 249-254, (2007).
141. **"An H/D isotopic substitution study of the $\text{H}_5\text{O}_2^+ \cdot \text{Ar}$ vibrational predissociation spectra: Exploring the putative role of Fermi resonances in the bridging proton fundamentals,"**
Laura R. McCunn, J. R. Roscioli, M. A. Johnson, A. B. McCoy, *J. Phys. Chem. B*, **112**, 321-327, (2008).

142. **“Why does argon bind to deuterium? Isotope effects and structures of $\text{Ar}\cdot\text{H}_5\text{O}_2^+$ complexes,”** L.R. McCunn, J. R. Roscioli, B.M. Elliott, M.A. Johnson, A.B. McCoy,” Submitted, *J. Phys. Chem. A*, March, (2007).
143. **“Intermolecular proton binding in the presence of a large electric dipole: Ar-tagged vibrational predissociation spectroscopy of $\text{CH}_3\text{CNH}^+\text{OH}_2$ and $\text{CH}_3\text{CNH}^+\text{OD}_2$ complexes.”** G. H. Gardenier, J.R. Roscioli, M.A. Johnson, *J. Phys. Chem. A*, **112** (47), 12022-12026, (2008).
144. **“Probing isomer interconversion in anionic water clusters using an Ar-mediated pump-probe approach: Combining vibrational predissociation and velocity-map photoelectron imaging spectroscopies.”** L.R. McCunn, G. H. Gardenier, T. L. Guasco, B. M. Elliott, J. C. Bopp, R. A. Relph, and M.A. Johnson *J. Chem. Phys.*, **128**, 234311, (2008).
145. **“Site-specific addition of D_2O to the $(\text{H}_2\text{O})_6^-$ “hydrated electron” cluster: Isomer interconversion and substitution at the double H-bond acceptor (AA) electron-binding site.”** L.R. McCunn, J. M. Headrick, M.A. Johnson, *Phys. Chem. Chem. Phys.*, **10**, 3118, (2008).
146. **“Exploring the correlation between network structure and electron binding energy in the $(\text{H}_2\text{O})_7^-$ cluster through isomer photoselected vibrational predissociation spectroscopy and ab initio calculations: Addressing complexity beyond types I-III.”** J. R. Roscioli, N. I. Hammer, M. A. Johnson, K. Diri and K. D. Jordan, *J. Chem. Phys.*, **128**, 104314, (2008).
147. **“Vibrational predissociation spectra of the O_n^- , $n = 3 - 10, 12$ clusters: Even-odd alternation in the core ion.”** J.C. Bopp, A.N. Alexandrova, B.M. Elliott, T. Herden., M. A. Johnson, *International Journal of Mass Spectrometry*, **283**, 94-99 (2009).
148. **“Photoelectron imaging study of vibrationally mediated electron autodetachment in the type I isomer of the water hexamer anion.”** B. M. Elliott, L.R. McCunn, M A. Johnson, *Chem. Phys. Lett.*, **467**, 32-36, (2008).
149. **“Vibrationally-induced interconversion of H-bonded $\text{NO}_2^- \cdot \text{H}_2\text{O}$ isomers within $\text{NO}_2^- \cdot \text{H}_2\text{O} \cdot \text{Ar}_m$ clusters using IR-IR pump-probe through the OH and NO stretching vibrations.”** R. A. Relph, B. M. Elliott, G. H. Weddle, M. A. Johnson, J.Ding, K.. D. Jordan, *J. Phys. Chem. A.*, **113**, 975-981 (2009).
150. **“Vibration induced proton transfer in $\text{F}^-(\text{H}_2\text{O})$ and $\text{F}^-(\text{D}_2\text{O})$.”** S. Horvath, A. McCoy, J. R. Roscioli, M. A. Johnson, *J. Phys. Chem. A*, **112** (48), 12337–12344, (2008).
151. **“Isolating the spectra of cluster ion isomers using Ar-“tag”-mediated IR-IR double resonance within the vibrational manifolds: Application to $\text{NO}_2^- \cdot \text{H}_2\text{O}$ ”** B. M. Elliott, R. A. Relph, J. R. Roscioli, J. C. Bopp, G.. H. Gardenier, T. L. Guasco, M. A. Johnson, *J. Chem. Phys.*, **129**, 094303, (2008).
152. **“Argon cluster-mediated isolation and vibrational spectra of peroxy and nominally D_{3h} isomers of CO_3^- and NO_3^- .”** R. A. Relph, J. C. Bopp, M.A. Johnson, *J. Chem. Phys.*, **129**, 064305, (2008).

153. **“Generating spectra from ground state wave functions: Unraveling anharmonic effects in the OH(H₂O) vibrational predissociation spectrum.”** A. B. McCoy, E. G. Diken, and M. A. Johnson, *J. Phys. Chem. A*, accepted.
154. **“Experiment and Theory in Harmony,”** M. A. Johnson, *Nature Chemistry*, Feature Article, **1**, 8 (2009).
155. **Survey of Ar-tagged predissociation and vibrationally mediated photodetachment spectroscopies of the vinylidene anion, C₂H₂⁻**
H. K. Gerardi, K. J. Breen, T. L. Guasco, G. H. Weddle, G.H. Gardenier, J. E. Laaser, and M. A. Johnson, *J. Phys. Chem. A*, **114** (3), 1592-1601, (2010).
156. **Anharmonicities and isotopic effects in the vibrational spectra of X⁻·H₂O, ·HDO, and ·D₂O [X = Cl, Br, and I] binary complexes**
S. Horvath, A.B. McCoy, B.M. Elliott, G. H. Weddle, J. R. Roscioli, M..A. Johnson, *J. Phys. Chem. A*, **114** (3), 1556-1568, (2010).
157. **How the shape of an H-bonded network controls proton-coupled water activation in HONO formation**
Rachael A. Relph, Timothy L. Guasco, Ben M. Elliott, Michael Z. Kamrath, Anne B. McCoy, Ryan P. Steele, Daniel P. Schofield, Kenneth D. Jordan, Albert A. Viggiano, Eldon E. Ferguson and Mark A. Johnson, *Science*, **327**, 308-312, (2010).
158. **Structural Characterization of (C₂H₂)₁₋₆⁺ Cluster Ions by Vibrational Predissociation Spectroscopy**
Rachael A. Relph, Joseph C. Bopp, Joseph R. Roscioli, and Mark A. Johnson, *J. Chem. Phys.*, **131**, 114305, (2009).
159. **Structural Evolution of the [(CO₂)_n(H₂O)]⁻ Cluster Anions: Quantifying the Effect of Hydration on the Excess Charge Accommodation Motif**
Azusa Muraoka, Yoshiya Inokuchi, Nathan I. Hammer, Joong-Won Shin, Takashi Nagata, and Mark A. Johnson, *J. Phys. Chem. A*, **113** (31), 8942-8948, (2009).
160. **Vibrational predissociation spectroscopy of the H₂-tagged mono- and dicarboxylate anions of dodecanedioic acid** Michael Z. Kamrath, Rachael A. Relph, Timothy L. Guasco, Christopher M. Leavitt, and Mark A. Johnson, *Int. J. Mass Spectrom.*, **300**, 91-98 (2011).
161. **Vibrational predissociation spectroscopy and theory of Ar-tagged, protonated Imidazole (Im) Im₁₋₃H⁺·Ar clusters** Helen K. Gerardi, George H. Gardenier, Usha Viswanathan, Scott M. Auerbach, and Mark A. Johnson, *Chem. Phys. Lett.*, **501**, 172-178, (2011).
162. **Vibrational predissociation spectrum of the carbamate radical anion, C₅H₅N-CO₂⁻, generated by reaction of pyridine with (CO₂)_m⁻** Michael Z. Kamrath, Rachael A. Relph, and Mark A. Johnson, *J. Am. Chem. Soc.*, (communication) **132** (44), 15508-15511, (2010).
163. **Downsizing the Hydrated Electron's Lair** Kenneth D. Jordan and Mark A. Johnson, *Science*, **329**, 42-43, (2010).

164. **Isolating the spectral signatures of individual sites in water networks using vibrational double-resonance spectroscopy of cluster isotopomers** Timothy L. Guasco, Ben M. Elliott, Mark A. Johnson, Jing Ding and Kenneth D. Jordan, *J. Phys. Chem. Lett.*, **1**, 2396-2401, (2010).
165. **Vibrational Predissociation Spectra of the Ar-Tagged [CH₄ · H₃O⁺] binary complex: Spectroscopic Signature of hydrogen bonding to an alkane** Solveig Gaarn Olesen, Timothy L. Guasco, Gary H. Weddle, Steen Hammerum, and Mark A. Johnson, *Mol. Phys.*, **108** (7), 1191-1197, (2010).
166. **Tribute to W. Carl Lineberger** Mark A. Johnson and Anne B. McCoy, *J. Phys. Chem. A*, **114** (3), 1225-1226, (2010).
167. **Unraveling anharmonic effects in the vibrational predissociation spectra of H₅O₂⁺ and its deuterated analogues** Timothy L. Guasco, Anne B. McCoy, and Mark A. Johnson, *J. Phys. Chem. A*, **115** (23), 5847-5858, (2011).
168. **Vibrational characterization of simple peptides using cryogenic infrared photodissociation of H₂-tagged, mass-selected ions** Michael Z. Kamrath, Etienne Garand, Peter A. Jordan, Christopher M. Leavitt, Arron B. Wolk, Michael J. Van Stipdonk, Scott J. Miller, and Mark A. Johnson, *J. Am. Chem. Soc.*, **133** (16), 6440-6448, (2011).
169. **The importance of NO⁺(H₂O)₄ in the conversion of NO⁺(H₂O)_n to H₃O⁺(H₂O)_n: I. Kinetics measurements and statistical rate modeling** Nicole Eyet, Nicholas S. Shuman, Albert A. Viggiano, Jürgen Troe, Rachael A. Relph, Ryan P. Steele, and Mark A. Johnson, *J. Phys. Chem. A*, **115** (26), 7582-7590, (2011).
170. **Tuning the intermolecular proton bond in the H₅O₂⁺ "Zundel ion" scaffold** Solveig G. Olesen, Timothy L. Guasco, Joseph R. Roscioli, and Mark A. Johnson, *Chem. Phys. Lett.*, **509** (4-6), 89-95, (2011). (Frontiers Article, Cover Article)
171. **Characterizing the Intramolecular H-bond and Secondary Structure in Methylated GlyGlyH⁺ with H₂ Predissociation Spectroscopy** Christopher M. Leavitt, Arron B. Wolk, Michael Z. Kamrath, Etienne Garand, Michael J. Van Stipdonk, and Mark A. Johnson, *J. Am. Soc. Mass Spectrom.*, **22** (11), 1941-1952, (2011).
172. **NH⁺-F Hydrogen Bonding in a Fluorinated "Proton Sponge" Derivative: Integration of Solution, Solid State, Gas Phase and Computational Studies** Michael Scerba, Christopher Leavitt, Matthew Diener, Andrew DeBlase, Timothy Guasco, Maxime Siegler, Nathaniel Bair, Mark Johnson, and Thomas Lectka, *J. Org. Chem.*, **76** (19), 7975-7984, (2011).
173. **Unraveling the anomalous solvatochromic response of the formate ion vibrational spectrum: An infrared, Ar-tagging study of the HCO₂⁻, DCO₂⁻, and HCO₂⁻·H₂O ions** Helen K. Gerardi, Andrew F. DeBlase, Xiaoge Su, Kenneth D. Jordan, Anne B. McCoy, and

Mark A. Johnson, *J. Phys. Chem. Lett.*, **2**, 2437-2441, (2011).

174. **A bottom-up view of water network-mediated CO₂ reduction using cryogenic cluster ion spectroscopy and direct dynamics simulations** Kristin J. Breen, Andrew F. DeBlase, Timothy L. Guasco, Vamsee K. Voora, Kenneth D. Jordan, Takashi Nagata, and Mark A. Johnson, *J. Phys. Chem. A* (Invited Feature Article, Cover), **116**, 903-912 (2012).
175. **Determination of non-covalent host-guest linkages through vibrational spectroscopy of cold gas-phase complexes** Etienne Garand, Michael Z. Kamrath, Peter A. Jordan, Arron B. Wolk, Christopher M. Leavitt, Anne B. McCoy, Scott J. Miller, and Mark A. Johnson, *Science*, **335**, 694-698 (2012).
176. **Structural characterization of electron-induced proton transfer in the formic acid dimer anion, (HCOOH)₂⁻, with vibrational and photoelectron spectroscopies** Helen K. Gerardi, Christopher M. Leavitt, Andrew F. DeBlase, Xiaoge Su, Kenneth D. Jordan, Anne B. McCoy, and Mark A. Johnson, *J. Chem. Phys.*, **136**, 146318 (2012).
177. **Characterization of highly unusual NH⁺-O hydrogen bonding to ester ether oxygen atoms through spectroscopic, kinetic and computational studies** Michael T. Scerba, Andrew F. DeBlase, Steven Bloom, Travis Dudding, Mark A. Johnson, and Thomas Lectka, *J. Phys. Chem. A*, **116**, 3556 (2012).
178. **Vibrational manifestations of strong non-Condon effects in the H₃O⁺•X₃ (X=Ar, N₂, CH₄, H₂O) complexes: Microscopic analogues of the "association band" in the vibrational spectrum of water** Anne B. McCoy, Timothy L. Guasco, Christopher M. Leavitt, Solveig G. Olesen, and Mark A. Johnson *Phys. Chem. Chem. Phys.*, (Perspective Article, Cover), **14**, 7205-7214 (2012).
179. "Water," Robert G. Bryant, Mark A. Johnson, Peter J. Rossky, *Acc. Chem. Res.*, (2012), **45** (1), pp 1–2.
180. "Vibrational Fano Resonances in Dipole-Bound Anions," Stephen T. Edwards, Mark A. Johnson and John C. Tully, *J. Chem. Phys.* **136**, 154305 (2012). *Editor's highlights*
181. "Isomer-specific IR-IR Double-Resonance Spectroscopy of D₂-Tagged, Protonated Dipeptides Prepared in a Cryogenic Ion Trap," Christopher M. Leavitt, Arron B. Wolk, Joseph A. Fournier, Michael Z. Kamrath, Etienne Garand, Michael J. van Stipdonk, and Mark A. Johnson, *J. Phys. Chem. Lett.* **3**, 1099-1105 (2012).
182. "Characterization of an Activated Iridium Water Splitting Catalyst using Infrared Photodissociation of H₂ Tagged Ions," Etienne Garand, Joseph A. Fournier, Michael Z. Kamrath, Nathan D. Schley, Robert H. Crabtree and Mark A. Johnson, *Phys. Chem. Chem. Phys.*, **14**, 10109-10113 (2012).
183. "Modes of Activation of Organometallic Iridium Complexes for Catalytic Water and C-H Oxidation," Andrew J. Ingram, Arron B. Wolk, Cornelia Flender,

- Jialing Zhang, Christopher J. Johnson, Ulrich Hintermair, Robert H. Crabtree, Mark A. Johnson, Richard N. Zare, *Inorg. Chem.* (cover article), **53**, 423-433 (2013).
184. **“Cryogenic Ion Chemistry and Spectroscopy,”** Arron B. Wolk, Christopher M. Leavitt, Etienne Garand, and Mark A. Johnson, *Accounts of Chemical Research*, **47**, 202, (2013).
185. **“Ionic liquids from the bottom up: Local assembly motifs in [EMIM][BF4] through cryogenic ion spectroscopy,”** Christopher J. Johnson, Joseph A. Fournier, Conrad T. Wolke, and Mark A. Johnson, *J. Chem. Phys.*, **139**, 224305 (2013).
186. **“Hiding in Plain Sight: Unmasking the Diffuse Spectral Signatures of the Protonated N-Terminus in Simple Peptides,”** Christopher M. Leavitt, Andrew F. DeBlase, Michael van Stipdonk, Anne B. McCoy, and Mark A. Johnson, *J. Phys. Chem. Lett.*, **4**, 3450 (2013).
187. **“Integration of cryogenic ion vibrational predissociation spectroscopy with a mass spectrometric interface to an electrochemical cell,”** Joseph A. Fournier, Arron B. Wolk, and Mark A. Johnson, *Anal. Chem.*, **85**, 7339 (2013).
188. **“Structures and fragmentation pathways of size-selected, D₂-tagged ammonium/methylammonium bisulfate clusters,”** Christopher J. Johnson, Mark A. Johnson, *J. Phys. Chem. A*, **117**, 13265 (2013).
189. **“Origin of the diffuse vibrational signature of a cyclic intramolecular proton bond: anharmonic analysis of protonated 1,8-disubstituted naphthalene ions,”** Andrew F. DeBlase, Steven Bloom, Thomas Lectka, Kenneth D. Jordan, Anne B. McCoy, and Mark A. Johnson, *J. Chem. Phys.*, **139**, 24301 (2013).
190. **“Aggregation of Small Molecules: From Dimers to Crystals,”** Gautam Desiraju, Mark A. Johnson, and Wolfram Sander, *ChemPhysChem.*, **14**, 631-633 (2013).
191. **“Isolation and Characterization of a Peroxo Manganese(III) Dioxygen Reaction Intermediate Using Cryogenic Ion Vibrational Predissociation Spectroscopy,”** Arron B. Wolk, Christopher M. Leavitt, Joseph A. Fournier, Michael Z. Kamrath, Gayan Wijeratne, Timothy A. Jackson and Mark A. Johnson, *Int. J. Mass. Spectrom.*, **354-355**, 33-38 (2013).
192. **“Quantifying intrinsic ion-driven conformational changes in diphenylacetylene supramolecular switches with cryogenic ion vibrational spectroscopy,”** Arron

Wolk, Etienne Garand, Ian Jones, Andrew Hamilton, and Mark Johnson, *J. Phys. Chem. A*, **117**, 5962-5969 (2013).

193. **“Vibrational Predissociation Spectroscopy of Ar-Tagged, Trisubstituted Silyl Cations,”** Andrew F. DeBlase, Michael T. Scerba, Thomas Leckta, and Mark A. Johnson, *Chem. Phys. Lett.*, **568–569**, 9-13 (2013).
194. **“On the Character of the Cyclic Ionic H-Bond in Cryogenically Cooled Deprotonated Cysteine,”** Andrew F. DeBlase, Steven R. Kass, and Mark A. Johnson, *Phys. Chem. Chem. Phys.*, **16**, 4569 (2014).
195. **“On the Structure of a Gas-Phase Peptide Anion: Ion Mobility Spectrometry, Infrared Dissociation Spectroscopy and *ab initio* Computations of Deprotonated Leucine Enkephalin,”** Florian Schinle, Christoph R. Jacob, Arron B. Wolk, Jean-François Greisch, Matthias Vonderach, Patrick Weiss, Oliver Hampe, Mark A. Johnson, and Manfred M. Kappes, Under revision, *J. Phys. Chem. A*. (2014).
196. **“Vibrational spectral signature of the proton defect in the three-dimensional $\text{H}^+(\text{H}_2\text{O})_{21}$ cluster,”** Joseph A. Fournier, Christopher J. Johnson, Conrad T. Wolke, Gary H. Weddle, Arron B. Wolk, and Mark A. Johnson, *Science*, (2014).
197. **“From Quantum Mechanics to Molecular Mechanics: A Tribute to Kenneth D. Jordan,”** Johnson, Mark; Simons, Jack; Wang, Feng, *J. Phys. Chem. A*. (2014).
198. **“He-tagged vibrational spectra of the SarGlyH^+ and $\text{H}^+(\text{H}_2\text{O})_{2,3}$ ions: Quantifying Tag Effects in Cryogenic Ion Vibrational Predissociation (CIVP) spectroscopy”**, Christopher J. Johnson, Arron B. Wolk, Joseph A. Fournier, Erin N. Sullivan, Gary H. Weddle and Mark A. Johnson, *J. Chem. Phys.* (2014).
199. **“Site-Specific Vibrational Spectral Signatures of Water Molecules in the “Magic” $\text{H}_3\text{O}^+(\text{H}_2\text{O})_{20}$ and $\text{Cs}^+(\text{H}_2\text{O})_{20}$ Clusters,** Joseph A. Fournier, Conrad T. Wolke, Christopher J. Johnson, Mark A. Johnson, Nadja Heine, Sandy Gewinner, Wieland Schöllkopf, Tim K. Esser, Matias R. Fagiani, Harald Knorke, Knut R. Asmis, *Proc. Natl. Acad. Sci. USA*, **111**, 18132-18137 (2014).
200. **“Microhydration of Contact Ion Pairs in $\text{M}^{2+}\text{OH}^-(\text{H}_2\text{O})_{n=1-5}$ (M=Mg, Ca) Clusters: Spectral Manifestation of a Mobile Proton Defect in the First Hydration Shell,”** Christopher J. Johnson, Laura C. Dzugan, Arron B. Wolk, Christopher M. Leavitt, Joseph A. Fournier, Anne B. McCoy, and Mark A. Johnson, *J. Phys. Chem. A*, **118**, 7590-7597 (2014).
201. **“Cryogenic Ion Chemistry and Spectroscopy,”** Arron B. Wolk, Christopher M. Leavitt, Etienne Garand, and Mark A. Johnson, *Accounts of Chemical Research*, **47**, 202 (2014).

202. **“Comparison of the local binding motifs in the imidazolium-based ionic liquids [EMIM][BF₄] and [EMMIM][BF₄] through cryogenic ion vibrational predissociation spectroscopy: Unraveling the roles of anharmonicity and intermolecular interactions,”** Joseph A. Fournier, Conrad T. Wolke, Christopher J. Johnson, Anne B. McCoy, and Mark A. Johnson, *J. Chem. Phys.*, **17**, 8518-8529 (2015).
203. **“Modes of Activation of Organometallic Iridium Complexes for Catalytic Water and C-H Oxidation,”** Andrew J. Ingram, Arron B. Wolk, Cornelia Flender, Jialing Zhang, Christopher J. Johnson, Ulrich Hintermair, Robert H. Crabtree, Mark A. Johnson, Richard N. Zare, *Inorg. Chem.*, **53**, 423-433 (2014).
204. **“Persistence of dual free internal rotation in the helium “tagged” NH₄⁺(H₂O) ion-molecule complex: An unexpected dividend of quantum delocalization,”** Patrick J. Kelleher, Christopher J. Johnson, Joseph A. Fournier, Mark A. Johnson, and Anne B. McCoy, Submitted, (2015).
205. **“Thermodynamics of Water Dimer Dissociation in the Primary Hydration Shell of the Iodide Ion with Temperature-Dependent Vibrational Predissociation Spectroscopy”** Conrad T. Wolke, Fabian S. Menges, Niklas Totsch, Olga Gorlova, Joseph A. Fournier, Gary H. Weddle, Mark A. Johnson, Nadja Heine, Tim K. Esser, Harold Knorke, Knut R. Asmis, Anne B. McCoy, Daniel J. Arismendi-Arrieta, Rita Prosmiiti, Francesco Paesani, *J. Phys. Chem. A*, **119**, (10), 1859-1866 (2015).
206. **“Understanding the Ionic Liquid [NC4111][NTf₂] from Individual Building Blocks: An IR-Spectroscopic Study,”** Kenny Hanke, Martin Kaufmann, Gerhard Schwaab, Martina Havenith, Conrad T. Wolke, Olga Gorlova, Mark A. Johnson, Bishnu Kar, Wolfram Sander, Elsa Sanchez-Garcia, *Phys. Chem. Chem. Phys.*, submitted, (2015).
207. **“Snapshots of Proton Accommodation at a Microscopic Water Surface: Understanding the Vibrational Spectral Signatures of the Charge Defect in Cryogenically Cooled H⁺(H₂O)_{n=2-28} Clusters”** Joseph A. Fournier, Conrad T. Wolke, Mark A. Johnson, Tuguldur T. Odbadrakh, Kenneth D. Jordan, Shawn M. Kathmann, and Sotiris S. Xantheas, *J. Phys. Chem. A.*, **119**, 9425-9440 (2015).
208. **“Vibrational Signatures of Solvent-Mediated Deformation of the Ternary Core Ions in Size-Selected [MgSO₄Mg(H₂O)_{n=4-11}]²⁺ Clusters”** Joseph W. DePalma, Patrick J. Kelleher, Christopher J. Johnson, Joseph A. Fournier, and Mark A. Johnson, *J. Phys. Chem. A.*, **119**, 8294- 8302 (2015).
209. **“Synthesis, Characterization, and Nitrogenase-Relevant Reactions of an Iron Sulfide Complex with a Bridging Hydride”** Nicholas Arnet, Thomas Dugan, Fabian Menges, Brandon Mercado, William Brennessel, Eckhard Bill, Mark Johnson, and Patrick Holland, *J. Am. Chem. Soc.*, **137**, 13220- 13223 (2015).

210. **“Water Network-Mediated, Electron-Induced Proton Transfer in Anionic [C₅H₅N·(H₂O)_n]⁻ Clusters”** Andrew F. DeBlase, Conrad T. Wolke, Gary H. Weddle, Kaye A. Archer, Kenneth D. Jordan, John T. Kelly, Gregory S. Tschumper, Nathan I. Hammer, and Mark A. Johnson, *J. Chem. Phys.*, **143**, 144305 (2015).
211. **“Capture of CO₂ by a Cationic Ni^I Complex in the Gas Phase and Characterization of the Bound Activated CO₂ Molecule through Cryogenic Ion Vibrational Predissociation Spectroscopy”**, Fabian S. Menges, Stephanie M. Craig, Niklas Tötsch, Aaron Bloomfield, Subrata Ghosh, Hans-Jörg Krüger, and Mark A. Johnson, *J. Angew. Chem., Int. Ed.*, Accepted, (2015).

Invited Lectures: 2000-present

71. “Tracking down barriers in reactions by vibrational excitation of trapped entrance channel reaction intermediates,” ACS National meeting, San Francisco, March, 2000.
72. “Ions on the rocks: A cluster based exploration of anionic hydration” Colloquium, Univ. of Tennessee, Knoxville, February, 2000.
73. “Spectroscopic observations of vibrationally mediated slow electron capture,” Physics Department Colloquium, Univ. of Nebraska, Lincoln, February, 2000.
74. “Spectroscopic observations of vibrationally mediated slow electron capture” Faraday Discussion on Molecular Photoionization, York, England, April, 2000.
75. “How water networks are perturbed in the presence of an ion: An infrared exploration of the primary hydration shell” Telluride conference on water in confined geometries.
76. “Isolation and infrared spectroscopy of exotic ion-molecule complexes using argon cluster mediated synthesis,” ACS Washington, August, 2000.
77. Joint APS/ILS conference in Providence, RI, Oct. 2000.
78. Multiple contact ion-solvent interactions: Infrared cluster studies”, Pacifi-chem. Dec 2000.
79. “Infrared activation of ion-molecule reactions from trapped entrance channel complexes,” Seminaire du laboratoire, Universite Paris-Sud, Orsay, France, June 2000.
80. “Ions on the rocks: A cluster based exploration of anionic” Birmingham conference on Chemical Physics, April, 2000.
81. “How ions bind to molecules, radicals, and clusters,” Northeast regional ACS meeting, Storrs, CT, June 2000.
82. “Ions on the rocks: A cluster-based exploration of anion hydration” Univ. Of Pittsburgh Physical chemistry seminar.
83. “A cluster-based tour of the primary steps in anion solvation” Caltech Physical chemistry seminar, Oct. 2000.
84. Harvard Univ. Physical chemistry seminar, Nov. 2000.
85. European Workshop on Photoionization, Carry-le-Rouet, France, Oct. 2000.
86. “Infrared activation of ion-molecule reactions from trapped entrance channel complexes,”
87. “Ions on ice”, Univ. Of Arizona Physical Chemistry Seminar, Jan., 2001.
88. “Argon mediated synthesis and spectroscopy of cluster anions,” Five talks in Japan, Feb. 2001-JSPS fellow.
89. ACS San Diego, April, 2001.

90. Univ. Of Notre Dame, April, 2001.
91. "Surface vs internal solvation of anions in water clusters: What do we mean by "hydration shell" anyway?" Iowa St., April 13, 2001.
92. "Isomer-selective spectroscopy of cluster anions," Columbus, June, 2001.
93. "Isomer-selective spectroscopy of cluster anions," NERM ACS New Hampshire, Jun. 2001.
94. ACS National meeting: Chicago. "What clusters tell us about proton transfer reactions in solution" Aug. 2001.
95. "What clusters tell us about anionic hydration," Physical chemistry seminar, Brown University
96. "The anionic hydrogen bond," GRC Molec & Ionic Clusters, Jan., 2002.
97. "Cluster studies of anionic hydration," Physical Chemistry seminar, U.S.C.
97. "What clusters tell us about anionic hydration," Physical chemistry seminar, Brown University
98. "Electronic spectroscopy of tetroxygen anion in the infrared: Photochemical isomer conversion" Air Force Phillips lab, March, 2002.
99. ACS National meeting Orlando April 2002
100. "Isolating the charge transfer component of the anionic H-bond by spin suppression," Bomem Michealson Award symposium, March 2002.
101. "Binding water to extended charge distributions: Isolating the symmetrical motif," DAMOP, June, 2002.
102. "Vibrational adiabaticity and the structure of anion-water complexes," OSA meeting, Orlando Sept. 2002.
103. Physical Chemistry seminar, U. North Carolina, Jan. 2003.
104. "The anionic hydrogen bond," GRC on gas phase ions, March, 2003.
105. "Hydration of negatively charged domains: The role of vibrational adiabaticity", AACS, Georgia Tech and Emory Universities, April 2003.
106. "A spectroscopic view of the anionic hydrogen bond," Paris Observatory, Meudon, May 2003.
107. "Vibrational adiabaticity and the structure of molecular anion monohydrates," Telluride Conference on Dynamics on Multiple Surfaces, July, 2003.
108. "Attachment of slow electrons to water clusters," GRC on Photoions: Photoionization and Photodetachment, Sept, 2003.
109. "Mass selected spectroscopy of neutral water clusters by population-modulated electron attachment spectroscopy," ACS National Meeting, New York, Sept. 2003.
110. "Molecular aspects of ion hydration: Short, strong H-bonds and the primary hydration shells of hydroxide and hydronium," Chemistry department colloquium at Johns-Hopkins Univ., Nov. 2003.
111. Univ. of California, Berkeley, Physical Chemistry Seminar, Jan. 27, 2004.
112. Univ. of Indiana, Physical Chemistry Seminar, Feb. 2004
113. Univ. of Chicago, Department of Chemistry Colloquium, March, 2004
114. Plenary speaker at Columbus spectroscopy conference, June 2004
115. Invited speaker at GRC on water, Aug. 2004.
116. Invited speaker at ACS national meeting, Philadelphia, Aug. 2004.
117. Argonne National lab seminar, Feb. 2004.
118. Invited speaker, Conference on Low Temperature Chemistry, Berlin, Sept. 2004.
120. Chemistry Department Colloquium, N.Y.U. Nov. 2004
121. Physical Chemistry Seminar, Purdue University, January, 2005
122. Department Colloquium, Amherst University, Spring, 2005.

123. Invited speaker, GRC on Molecular Energy Transfer, Jan. 2005.
124. Condon Lecture, University of Colorado, Boulder, Feb. 4, 2005
125. Department Colloquium, Penn. State Univ., Feb. 2005
126. Invited speaker, ACS national meeting, San Diego, April 2005
127. Physical Chemistry Seminar, Colorado State Univ., Feb., 2005
128. Dynamics of Molecular Collisions, Asilomar, July 2005
129. Keynote speaker, A.S.M.S. San Antonio, May, 2005
130. ACS National meeting, Washington DC, August 2005
131. Yale Science Forum, May 2005
132. Nichols Medal Symposium (Zare awardee), April 2005
133. Northeast Quantum Chemistry Group, Sept. 2005
134. Femtochemistry IV, Washington DC, July, 2005
- 135-7. Pacifichem ACS meeting, Hawaii (Three invited lectures), Dec. 2005

2006

APS Plyler prize award lecture, APS March meeting
Roger Miller symposium, APS March meeting
Concordia University, Chemistry colloquium, Montreal
Columbia University, Chemistry colloquium
Gordon research conference on Molecular and Ionic Clusters (Buelton)
ACS National meeting, Atlanta, symposium on electron-molecule collisions
ACS National meeting, San Francisco, (2 talks)
University of Wisconsin, Madison, Department colloquium
University of Pennsylvania, Physical chemistry seminar
University of Kentucky, Department Colloquium
Wayne State, Physical Chemistry Seminar
Gordon Conference on vibrational spectroscopy (Maine)
Gordon Conference on atomic and molecular interactions (New Hampshire)
Gordon Conference on Electronic spectroscopy (Geneva)
Genesis Research Institute (Tokyo) conference on breakthroughs in cluster science
Jekyll Island conference on advances in clusters
Air Force office of scientific research contractor's meeting
DOE workshop on proton accommodation by water
Symposium in honor of Roger Miller, University of North Carolina
Amherst College, Department seminar
Telluride workshop on water and hydrogen bonding (V. Buch and V. Vaida, organizers)
University of Pittsburgh, Physical chemistry seminar

2007

UCLA Physical Chemistry Seminar, Jan. 28.
Wesleyan University Chemistry department colloquium, Feb. 3.
FEL workshop, Horizons in vibrational spectroscopy with free electron lasers, Munich, Feb. 21
Gordon Conference on Gas Phase Ions, Ventura, Feb. 25.
APS March meeting, Denver Co. March 7
Keynote speaker, Size-selected clusters-3, Brand, Austria, March 12-16
Physical Chemistry seminar, U. Minnesota, March 25
ACS Chicago National meeting, symposium on "The proton", March
Perspectives in Science: Cluster spectroscopy, Yale Freshman seminar, April 6.

University at Massachusetts, Amherst, Physical Chemistry seminar, April 19
Symposium in honor of Nobelist John Fenn's 90th birthday, Virginia Commonwealth Univ June 19.
Symposium on the dynamics of anions, Park City Utah, June.
ACS National meeting, Boston, August.
International symposium on high resolution spectroscopy, Dijon France, Sept.
Memorial symposium for Wilse Robinson, Univ. of Texas, Lubbock, Nov.
Perspectives in Science, Yale College: Water clusters!
Parent's weekend lecture, Yale, Oct.
DOE Contractors meeting for CPIMS directorate

2008

Physical Chemistry seminar, Univ. Calif. San Diego, March 4
YINQE Seminar, Yale College
Departmental seminar, Univ. of New Hampshire
ACS National meeting, New Orleans
AFOSR contractors
Radiation Chemistry GRC, June
Beckman Symposium Lecture, July
Telluride Summer workshop on non-adiabatic processes
Molecular and Ionic clusters GRC, Aussois, France
Workshop on water, Crete, June
Texas A&M departmental Colloquium, April

2009

Watkins Prize Lectures, Wichita State University (2)
ACS National Meeting invited lecture (Washington DC)
APS March Meeting invited lecture (Pittsburgh)
Holy Cross University, Department Colloquium
Northwestern, Department Colloquium
University of Texas, Physical Chemistry seminar
ASMS National meeting, Philadelphia, invited lecture
ASMS workshop on ion spectroscopy, Asilomar (invited lecture)
Workshop on cold ion traps, Aarhus Denmark (Invited lecture)
Session Chair, Gordon Conf. on Molecular Energy Transfer
Session Chair, Gordon Conf. on Biological Molecules in the Gas Phase
Forty Years of Ion Chemistry in Boulder

2010

GRC on Photoions
"Spectroscopy of Real Systems," Kyoto Japan
ACS National meeting, San Francisco (Floppy molecules)
ACS National meeting, Boston (Hydrates)
AFOSR Contractors Meeting
Columbus mini-symposium on floppy molecules
GRC on Water
GRC on Atomic and Molecular Interactions
GRC Molecular and Ionic Clusters

Site visit for CCI “Fueling the Future” overview talk
PacifiChem (2 talks, Frontiers in state-to-state dynamics and Clusters)
MIT Frontiers in Optics Lecture

Invitations declined: SASP Austria, Proton Mobility (Israel), Telluride (non-adiabatic dynamics)

2011

Colloquia:

1. UT Austin
2. Johns Hopkins
3. Brown
4. Washington University St. Louis
5. Inaugural John B Fenn Memorial Lecture, Virginia Commonwealth University

Conferences

6. ACS Anaheim- Spectroscopy of Isolated Biopolymers
7. Telluride workshop on vibrational spectroscopy of complex systems
8. Size-selected clusters – Davos, Switzerland
9. Argonne National Laboratory Chemistry Division Seminar
10. Dynamics of Molecular Collisions, Snowbird, Utah

Government agency contractor’s meetings

11. Air Force Office of Scientific Research, Contractor’s meeting, Pasadena, California
12. Department of Energy, CPIMS Contractor’s meeting, Baltimore, Maryland
13. Conference on Molecular Energy Transfer, Oxford, England

Outreach

14. Science Saturday’s “The Wild World of Electrified Water!”

2012

1. Basler Gesellschaft Lecture
2. Spectroscopy Frontier Lectures (3) Ohio State
3. FOR618 Symposium, Bochum, Germany
4. Baker Lecture Symposium, Cornell
5. ACS National Meeting, San Diego
6. Biomolecules in the gas phase, Les Diablerets, Switzerland
7. Physical Chemistry Seminar: U. Florida, Gainesville
8. Physical Chemistry Seminar, U. Pennsylvania
9. Keynote Lecture, Vibrational Spectroscopy GRC
10. Department Seminar, Bridgewater State University, MA

Discussion Leader:

11. Molecular and Ionic Clusters GRC, Ventura, CA
12. Photoions GRC, Galveston, Texas

2013

1. Tilde Science Café, Public lecture, “The Wild World of Electrified Water,” Branford, CT.
2. Lehigh University, Pchem seminar
3. Marquette University, Pchem seminar
4. Telluride meeting on vibrational dynamics
5. Plenary Lecture, German Physical Society
6. Kaiserslautern meeting on trimetallic complexes

7. Bochum symposium on Solvation
8. Molecular energy transfer GRC
9. ACS symposium New Orleans
11. ACS Symposium on Water, Indianapolis
12. DOE Contractor's meeting, CPIMS (Cancelled due to Government Shutdown)

Declined Invitations:

- 1 & 2. Frontier Lectures, Texas A&M, Student invited lecturer, Texas A & M
3. GRC on Biological Molecules in the gas phase

2014

1. SASP, Oberburgl, Austria
2. Oxford spectroscopy and dynamics
3. Molecular and Ionic Clusters GRC
4. ACS Dallas, Irving Langmuir Award Lecture
5. Atomic and molecular interactions GRC
6. ASCONA, Switzerland, Conference on nanostructures
7. Arizona, Dept. Colloquium
8. AFOSR contractor's meeting
9. Student invited talk, U. Indiana
10. Keynote lecture, Gordon research seminar, Vibrational dynamics GRC
11. Pittcon Lectures (2), Duquesne University
12. Department colloquium, Temple University
13. ACS National meeting, Spectroscopy and dynamics symposium, San Francisco
14. Chemistry department seminar, Technical University, Munich
15. NSF CCI CAICE annual meeting, La Jolla
16. Guest lecture at DOE Long Range Planning Committee for Basic Energy Sciences
17. DOE CPIMS contractor meeting, Maryland.

2015

1. McElvain lecture, University Wisconsin
2. Department Colloquium, University of Georgia
3. Plenary lecture, German Physical Chemistry Society (Deutsche Bunsen-Gesellschaft), Bochum
4. Student Invited Lecture, Analytical Division, University of Illinois
5. University of Leipzig
6. Telluride Workshop on Vibrational Spectroscopy
7. Dynamics of Molecular Collisions, Asilomar
8. Gordon Conference on Water
9. Harry Emmet Gunning Lecture Series (University of Alberta)
10. Plenary lecture, "Spectroscopy and Dynamics" symposium, Nottingham, England.
11. JILA workshop on Ultracold Chemistry
12. Reilly Lectures in Physical Chemistry (3, Notre Dame)

Declined invitations:

FEL workshop, Dalian China

2016

2. University of Mississippi
3. Molecular and Ionic Clusters Gordon Research Conference (Session Chair)
4. Vibrational Spectroscopy Gordon Research Conference (Session Chair)

5. Stauffer Lectures (2, Stanford University)
6. ACS National Meeting in San Diego, Aerosol symposium
1. Size selected clusters, Davos, Switzerland

Declined invitations:

- GRC on Photoions, Il Ciocco, Italy
- SASP, Davos, Switzerland

X. Research Group: 2014

Visiting Professor:

Prof. Gary Weddle, Fairfield Univ.

Post-doctoral Associates:

Dr. Christopher Johnson (NSF Postdoc)

Dr. Fabian Menges

Dr. Joseph DePalma

Graduate Students:

Arron Wolk

Andrew Deblase

Conrad Wolke

Joseph Fournier (USDEG Fellowship, declined NSF Graduate Fellowship)

Olga Gorlova

Patrick Kelleher

Stephanie Craig

Undergraduate research:

Luis Schachtner