Bing Gao

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OBJECTIVE

- A scientific position utilizing my research experience in mass spectrometry for biological molecule structure characterization

HIGLIGHTS OF QUALIFICATION

- Investigated small peptide/amino-acid structures and equilibrium hydration using ion mobility mass spectrometry
- Skilled in accurate mass measurement and structure determination using mass spectrometry
- Utilized quantum-mechanical electronic calculations and replica exchange molecular dynamics to verify structural identity
- Developed, built and maintained high-performance computer clusters
- Familiar with Windows, Unix and Linux operating systems and several programming languages

RESEARCH AND TEACHING EXPERIENCE

Postdoctoral Fellow - M. T. Bowers Group, University of California, Santa Barbara. July 2006 to Present.

- Analyze biomolecules with ion mobility mass spectrometry to elucidate structural conformers
- Examine hydration equilibrium with (nano) ESI mass spectrometry to obtain thermodynamic information for biomolecules
- Utilize quantum-mechanical electronic calculations and replica exchange molecular dynamics to verify thermodynamic data and structural identity
- Maintain mass spectrometers to keep instruments running efficiently

Research Assistant - Z.-L. Group, Chinese University of Hong Kong, Hong Kong. May 2003 to June 2006.

- Designed and built high-performance parallel computer clusters to achieve research goals
- Amended the source code of an existing molecular dynamics software package to fit the requirement of our particular calculations, compiled the parallel processing libraries and tested the performance of parallel computer clusters
- Assisted new graduate students and undergraduates who were beginning research in the laboratory

Teaching Assistant - Chemistry Department, Chinese University of Hong Kong, Hong Kong. May 2002 to June 2005.

- Led physical chemistry and computational chemistry discussion sections, reviewing lectures and problems sets to clarify concepts
- Instructed and supervised students in the operation of NMR, UV-visible, Mid-IR to Far IR, and Raman spectrometers and interpretation of experimental data

SPECIAL SKILLS AND TRAINING

Mass Spectrometry Instrumentation:

Ionization	*Mass separation*	*Ion mobility separation*	*Suppl. techniques*
ESI	quadrupole	Uniform-field drift cell	HPLC
nano-ESI	TOF	Traveling-wave	CD
MALDI			Solution NMR

Software:

- VASP(MD)
- AMBER
- Gaussian
- LAM/MPI
- MassLynx
- Merlin
- Linux
- UNIX
- Windows

Non-technical Skills:

- Ability to work productively in a collaborative environment
- Can communicate complex scientific ideas effectively

• Fluent in English and Mandarin

EDUCATION

Ph.D. - Physical Chemistry, Chinese University of Hong Kong, Hong Kong, May 2002 to June 2006.
Dissertation: First principles studies on the solvation and dissociation of hydrated di-anions and of solvated sodium

M.S. - Physical Chemistry, Liaoning Normal University, China, June 1998

B.S. - Chemistry, Liaoning Normal University, China, June 1995.

PUBLICATIONS

• *Gao, Bing*; Wyttenbach, Thomas; and Bowers, Michael T. "Hydration of Protonated Aromatic Amino Acids: Phenylalanine, Tryptophan and Tyrosine." Journal of the American Chemical Society (2009), in press.

• Drayss, Miriam K; Blunk, D; Oomens, Jos; Polfer, Nick; Schmuck, Carsten; *Gao, Bing*; Wyttenbach, Thomas; Bowers, Michael T.; and Schaefer, Mathias "Gas-Phase Structures of Solution-Phase Zwitterions: Charge Solvation or Salt Bridge?" Int. J. Mass Spectrom. 2009, 281, 97-100

• Drayss, Miriam K; Blunk, Dirk; Oomens, Jos; *Gao, Bing*; Wyttenbach, Thomas; Bowers, Michael T.; and Schaefer, Mathias "Systematic study of gas-phase ion structures of tertiary amino acids" *Submitted*

• *Gao, Bing*; Wyttenbach, Thomas; and Bowers, Michael T. "Hydration of Protonated Arginine and Lysine." in manuscript.

• *Gao, Bing*; Wyttenbach, Thomas; and Bowers, Michael T. "Hydration of Protonated methionine and its oxidation." in manuscript.

• Buck, Udo; Dauster, Ingo; *Gao, Bing*; and Liu, Zhi-Feng. **"**Infrared Spectroscopy of Small Sodium-Doped Water Clusters: Interaction with the Solvated Electron." Journal of Physical Chemistry A (2007), 111(49), 12355-12362.

• *Gao, Bing*; Liu, Zhi-Feng. "Ionization Induced Relaxation in Solvation Structure: A Comparison Between $Na(H_2O)_n$ and $Na(NH_3)_n$." The Journal of Chemical Physics (2007), 126(8), 084501.

• *Gao, Bing*; Liu, Zhi-Feng. **"**First Principles Study on the Solvation and Structure of $C_2O_4^{2-}(H_2O)_n$, n = 6-12.**"** Journal of Physical Chemistry A (2005), 109(40), 9104-9111.

• *Gao, Bing*; Liu, Zhi-Feng. **"**Size-Dependent Charge-Separation Reaction for Hydrated Sulfate Dianion Cluster, $SO^{2-}(H_2O)_n$, with n= 3-7." The Journal of Chemical Physics (2005), 123(22), 224302.

• *Gao, Bing*; Liu, Zhi-Feng. **"**A First Principles Study on the Solvation and Structure of $SO_4^{2-}(H_2O)_n$, n = 6-12.**"** Journal of Chemical Physics (2004), 121(17), 8299-8306.

CONFERENCE PRESENTATIONS

Conference on Ion Chemistry and Mass Spectrometry - January 16 to 18, 2009 - Lake Arrowhead, CA
"**Structures of Potassiated Aminocarboxylic Acids and Proline Derivatives Examined by IMS/MS**" - *poster*
Gao, Bing; Wyttenbach, Thomas; Drayss, Miriam K; Schaefer, Mathias; and Michael T. Bowers

Conference on Ion Chemistry and Mass Spectrometry - January 11 to 13, 2008 - Lake Arrowhead, CA
"Hydration of Protonated Amino Acids" - *oral presentation*
Gao, Bing; Wyttenbach, Thomas; and Michael T. Bowers

Conference on Ion Chemistry and Mass Spectrometry - January 12 to 14, 2007 - Lake Arrowhead, CA

"Size-Dependent Charge-Separation Reaction for $SO_4^{2-}(H_2O)_n$ with n=3-7 " - *oral presentation*
Bing Gao and Zhi-Feng Liu

COLLABORATIONS

Prof. Udo Buck at the Max-Planck-Institut für Dynamik und Selbstorganisation, Göttingen, Germany
- Calculated frequency spectra and interpreted experimental IR spectra
- One collaborative publication

Prof. Mathias Schäfer at the institute for Organic Chemistry, University Cologne, Köln, Germany
- Examined synthetic biomolecule-like compounds with IM/MS and T-Wave/MS
- Compared extensive modeling of solution- and gas-phase structures of biomolecule-like compounds to experiment
- Two collaborative publications

RESEARCH INTERESTS

- Biomolecule hydration equilibrium measurement
- Protein/peptide structure characterization
- Structural variations between solution and gas phase

Hard copy and/or electronic versions of all references available upon request