Musahid Ahmed, Ph.D

MS 6R-2100, LBNL
1 Cyclotron Road
Berkeley, CA-94720

1-510-486-6355 (PH)
1-510-486-5311 (FAX)
Mahmed@lbl.gov

Website

Brief Biography

I am a scientist at Lawrence Berkeley National Laboratory (LBNL), Berkeley, CA, and my research is geared towards coupling novel instruments and approaches to synchrotron radiation to perform cutting edge work in chemical physics and physical chemistry. I did my doctoral work at University of Cambridge, England and was a postdoctoral research fellow at Universities of Leicester & Manchester in England and at the Max Planck Institute in Gottingen, Germany before joining LBNL in 1995. My focus is to understand and map the physical and chemical principles that govern complicated phenomena in nature. My goal is to gain a molecular level understanding of alternative carbon neutral energy sources and global climate change, which has led me to work in the fields of imaging and biological mass spectrometry, atmospheric and environmental chemistry, and dynamics of combustion processes. My current interests include: ultrafast photon science incorporating lasers with synchrotron radiation to probe charge and proton transfer dynamics in solvated systems, correlated imaging mass spectrometry/fluorescence microscopy platforms for microbiology and developing new spectroscopic and imaging tools to probe dynamics.

Academic Qualifications

PhD Physical Chemistry, 1989, University of Cambridge, U.K.
Thesis Adviser: Dr. A.B. Callear

BSc (Hons) Chemistry, 1985. University of Delhi, India.

Professional Experience

Program Leader- Chemical Characterization, Transformations, and Dynamics at the Advanced Light Source, Lawrence Berkeley National Laboratory, Berkeley, CA (Appointed October 2013)

Senior Scientist – Chemical Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, CA (Appointed July 2010)

Interim Beamline Director – Chemical Dynamics Beamline, Advanced Light Source, Lawrence Berkeley National Laboratory, Berkeley, CA (January-June 2009, January-June 2010)

Staff Scientist – Chemical Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, CA (2000-2010)

Scientist – Chemical Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, CA (1995-2000)

Post-doctoral Research Fellow – University of Manchester, U.K. 1993-1995 (Prof. J. C. Whitehead);
Max Planck Institute for Strömungsforschung, Göttingen, Germany. 1991-1993 (Prof. P. Potzinger);
University of Leicester U.K. and British Petroleum, Sunbury, U.K. 1989-1991 (Prof. I. M. T. Davidson)

Awards and Grants

Integrated Imaging of Microbial Community Response to External Threats, Laboratory Directed Research Funding, Lawrence Berkeley National Laboratory, 2012

Optimizing plant-microbe interactions for sustainable supply of nitrogen for bioenergy crops, Laboratory Directed Research Funding, Lawrence Berkeley National Laboratory, 2012

New methods and insight into the structure and evolution of melanin-based color in birds and other dinosaurs, NSF, 2012

Visualizing Functional Surfaces with Molecular Nano-imaging, DOE grant, 2006

The Camille and Henry Dreyfus Foundation Grant for Environmental Chemistry, 2005

Gas phase studies of the building blocks of life, Laboratory Directed Research Funding, Lawrence Berkeley National Laboratory, 2003-2006

Outstanding Performance Award, Lawrence Berkeley National Laboratory, 2003

Overseas Research Scholarship, Cambridge University, U.K. 1986-1988

Professional membership and activities

Fellow of American Physical Society.

Member of American Chemical Society.

Member of American Association for the Advancement of Science. Editorial

Board – Journal of Visualized Experiments.

Reviewer - Journal of Physical Chemistry, Journal of the American Chemical Society, Journal of Chemical Physics, Journal of American Society of Mass Spectrometry, Rapid Communications in Mass Spectrometry, Chemical Physics, Chemical Physics Letters, Analytical Chemistry, Journal of Mass Spectrometry, Progress in Energy and Combustion Science, New Journal of Chemistry, Chemistry- an Asian Journal.

Co-organizer - session "Physical chemistry for a sustainable future" at the 44th ACS Western Regional Meeting. San Jose, October 2013

Organizing Committee and discussion leader - International Workshop on Photon Tools for Combustion and Energy Conversion, Argonne National Labs. February 2013

Organizer- Advanced Light Source User Meeting Workshop – New directions in probing chemistry and physics with lasers and synchrotrons. Berkeley, October 2012

Discussion leader -2011 Gordon Research Conference (GRC) on gaseous ions, Galveston, TX, February 2011

Discussion leader -2009 Gordon Research Conference (GRC) on Atomic and Molecular Interactions, New Hampshire, July 2009

Organizer- Advanced Light Source User Meeting Workshop – Energy and Environmental Science with Synchrotron Radiation. Berkeley, October 2008

Organizer- Advanced Light Source User Meeting Workshop – Atoms to Aerosols with Synchrotron Radiation. Berkeley, October 2002

Member of committees

Laboratory Staff committee, Lawrence Berkeley National Laboratory (2013-2016)
Staff committee, Chemical Sciences Division, Lawrence Berkeley National Laboratory (2010-present)
Best Practices Diversity Council, Lawrence Berkeley National Laboratory (2001-2004)

Scientific Collaborators (2005-present)

Manfred Auer (LBNL), Ali Belkacem (LBNL), Matthew Berg (Mississippi), Joel Bowman (Emory), Kristie Boering (UC, Berkeley), Ksenia Bravaya (Boston), Chris Cappa (UC. Davis), Romy Chakraborty (LBNL), Agnes Chang (National Dong Hwa, Taiwan), John Daily (Colorado, Boulder), Hugo Destaillats (LBNL), Luke Hanley (Illinois, Chicago), Mike Duncan (Georgia, Athens), Barney Ellison (Colorado, Boulder), Oliver Gessner (LBNL),Martin Head Gordon (Berkeley), Debashree Ghosh (NCL, India), Mattanjah De Vries (UC Santa Barbara), Ralf Kaiser (Hawaii, Manoa), Kostas Kalogerakis (SRI), Marcus Kleber (U Oregon), Anna Krylov (USC), Stephen Klippenstein (ANL), Stephen Leone (LBNL, UC Berkeley), Dominic Loque (LBNL), Alex Mebel (Florida International), Ricardo Metz (Mass., Amherst), Dan Neumark (Berkeley), Peter Nico (LBNL), Trent Northen (LBNL), Deirdre Olynick (LBNL), David Osborn (Sandia), Darcy Peterka (Columbia), Corie Ralston (LBNL), Fritz Schaeffer III (Georgia, Athens), George Schatz (Northwestern), Matt Shawkey (Akron) Tom Slanger (SRI), Dan Slaughter (LBNL), Mohamed Sleiman (LBNL), John Stanton (Texas, Austin), Craig Taatjes (Sandia), Mark Thiemens (UC San Diego), Kevin Wilson (LBNL), Doug Worsnop (Aerodyne), Jingsong Zhang (UC Riverside).

Postdoctoral and graduate student supervision (2002-present)

Biswajit Bandhopadhay (LBNL-present), Leonid Belau (LAM), Yigang Fang (LBNL-present), Amir Golan (Civan Advanced Technologies, Israel), Theresa Hofstetter (US Air Force), Oleg Kostko (SRI), Shirley Liu (Kyoto, Japan), Christophe Nicholas (Synchrotron Soleil, France), Lionel Poisson (CNRS, France), Lynelle Takahashi (DOW), Tyler Troy (LBNL-present), Jinian Shu (Institute Eco Environment, China), Jia Zhou (Wisconsin, Madison).

Invited talks and lectures (1999-present)

Hot Nozzles & Cold Beams: Revealing Ion Chemistry, Solvation, & Dynamics. Seminar, Joint Center for Artificial Photosynthesis, Berkeley, CA, November 2014

Hot Nozzles & Cold Beams: Revealing Ion Chemistry, Solvation, & Dynamics. ISIC Seminar, Ecole Polytechnique, Lausanne, Switzerland, October 2014

Rings of Fire: From Carbon to the Grain. Advanced Light Source User Meeting, Berkeley, CA, October 2014

Chemistry at ALS. International Workshop in Photon Tools for Physical Chemistry, Beatenberg, Switzerland, October 2014

Hot Nozzles & Cold Beams: Revealing Ion Chemistry, Solvation, & Combustion. Seminar, Synchrotron Soleil, France, September 2014

Probing proton transfer, ion chemistry, and excitonic transfer in clusters with VUV radiation. Summer School on Interatomic Coulombic Decay (ICD), Bad Honnef, Germany, September 2014

Mass spectrometry based approaches to probe bacterial and archaeal colonies and environments. Extreme Biochemistry Symposium, American Chemical Society National Meeting, San Francisco, CA, August 2014

Hot Nozzles & Cold Beams: Revealing Ion Chemistry, Solvation, & Combustion. NASA Ames, Chemistry Seminar, Mountain View, CA, August 2014

Probing dynamics with multi-color, multi-pulse laser and synchrotron photons. 7th International Conference on Coherent Multidimensional Spectroscopy, Eugene, OR, July 2014

Laser desorption mass spectrometry coupled to synchrotron radiation for analysis of complex organic matter. Conference on Lasers and Electro-Optics, San Jose, CA, June 2014

The Chemical Dynamics Beamline, DOE Gas Phase Chemical Physics Contractor's meeting, Potomac, MD, May 2014

Probing Chemical Systems with Synchrotron Radiation, Chemistry seminar, KAUST, Saudi Arabia, Dec 2013.

Synchrotron based photoionization mass spectrometry for chemical problems, Physical Chemistry & Chemical Physics Seminar, Dept. of Chemistry and Biochemistry, University of Colorado, JILA, Boulder, CO, Nov 2013

Synchrotron based photoionization mass spectrometry for chemical problems, Seminar, NREL, Golden, CO, Nov 2013

Laser desorption, molecular beams, and synchrotron radiation for analysis of complex organic matter, 246 ACS National Meeting, Astrochemistry Symposium, Indianapolis, IN., September 2013

Synchrotron based photoionization mass spectrometry for chemical problems, Molecular foundry seminar, LBNL, July 2013

Synchrotron based photoionization mass spectrometry, Chemistry seminar, Indian Institute of Technology, Guwahati, Assam, India, June 2013

Synchrotron based photoionization mass spectrometry for chemical systems, Chemistry seminar, Tezpur University, Assam, India, June 2013

Chemical physics at a synchrotron… excitons, proton transfer and water, ALS Cross-Cutting Review/Workshop on Dynamics and Spectroscopy of Atoms, Ions, and Molecules, LBNL, April 2013

Synchrotron based tools for studying combustion chemistry and molecular growth mechanisms. International Workshop on Photon Tools for Combustion and Energy Conversion, Argonne National Labs. March 2013

Performing astrophysical measurements at a synchrotron, First workshop on laboratory experimental astrophysics, Kauai, Hawaii, February 2013

Imaging Mass Spectrometry with lasers, ion beams and synchrotron, Integrative Bioimaging seminar series, Lawrence Berkeley National Laboratory, November 2012

Electronic Structure and Proton Transfer in Hydrogen Bonded, π Stacked and Micro-Hydrated Systems, CPIMS-DOE contractors meeting, Washington DC, October 2012

Imaging Mass Spectrometry and Electronic Structure of Organic Molecules, Glen T. Seaborg Center Seminar, LBNL, October 2012

Probing electronic structure and proton transfer in stacked and solvated systems, visualizing fossil feathers and identifying dirt with synchrotron radiation, Analytical and Physical Chemistry Seminar, University of Texas, Austin, September 2012

(1) Probing molecular growth and thermal decomposition processes with a heated tubular reactor and tunable VUV radiation; (2) *A Next Generation X-ray Laser Array at the Berkeley Lab*. International Workshop on Frontiers in Synchrotron Tools for Studies of Combustion and Energy, Shanghai, China, October 2011
Spectroscopy, analysis, and imaging of molecules with synchrotron radiation and laser desorption, Telluride Workshop "New Frontiers and Grand Challenges in Laser-based Biological Microscopy", Telluride, CO, August 2011

Probing Kinetics with Synchrotron Radiation. International Conference on Chemical Kinetics, Cambridge, MA, July 2011

Spectroscopy, Analysis, and imaging of organic molecules with vacuum ultraviolet synchrotron radiation, Seminar at Environmental and Molecular Sciences Laboratory, PNNL, Richland, May 2011

Mass Spectrometry with VUV radiation, First Annual Berkeley Metabolomics Symposium, LBNL, Berkeley, Jan. 2011

Imaging mass spectrometry, cluster and biomolecule energetics with VUV radiation, Chemical Society seminar, Cotton College, Guwahati, India, Dec 2010

Imaging mass spectrometry, cluster and biomolecule energetics with VUV radiation, Chemistry department seminar, Guwahati University, India, Dec 2010

Imaging Mass Spectrometry, aerosol chemistry, cluster and biomolecule energetics with VUV radiation. Topical Conference on Interaction of EM Radiation with Atoms, Molecules & Clusters (TC - 2010), RRCAT, Indore, India, March 2010

Imaging Mass Spectrometry, aerosol chemistry, cluster and biomolecule energetics with VUV radiation. National workshop on catalysis-2009, Catalysis for clean environment and sustainable future. Tezpur University, India, December 2009

Imaging Mass Spectrometry, Aerosol Chemistry and Biomolecule Energetics with VUV Radiation. Condensed Phase, Interfaces and Molecular Sciences (CPIMS) DOE contractors meeting, Arlington, VA, October 2009

Investigating atoms to aerosols with Synchrotron Radiation, Chemistry Dept. Seminar, University of the Pacific, Stockton, October 2009

"WE LUV VUV" Investigating atoms to aerosols with Synchrotron Radiation, Chemistry Dept. Seminar, University of Southern California, Los Angeles, August 2009

Energy and Environmental science at a synchrotron; Aerosol Chemistry, Nanoparticle Physics, Biomolecule energetics with VUV radiation; Physical Chemistry Chemical Physics with Synchrotron Radiation, Visualizing Chemistry and Biology with IR, VUV, and X-Ray photons; 4 lectures at the Joint ICTP/IAEA School on Novel Synchrotron Radiation Applications, Trieste, Italy, March 2009

Investigating atoms to aerosols with VUV Synchrotron Radiation, ALS ESG/SSG seminar, LBNL, Berkeley, CA, November 2008

Energy and Environmental science at a synchrotron, workshop at ALS user meeting, Berkeley, CA, Oct. 2008

Visualizing organic surfaces with imaging mass spectrometry, Visualizing Chemistry: Advances in Chemical Imaging, ACS National Meeting, Philadelphia, August 2008

Investigating Atoms to Aerosols with Vacuum Ultraviolet Radiation, DOE Imaging, Separations and Analysis Contractors meeting, Annapolis, Maryland, May 2008

Aerosol Chemistry, Nanoparticle Physics, and Imaging Mass Spectrometry with Vacuum Ultraviolet (VUV) Radiation, PIRE-ECCI Seminar series, UCSB, Santa Barbara, CA, February 2008

Physical Chemistry Chemical Physics with Synchrotron Radiation, SESAME users annual meeting, Amman, Jordan, Nov 2007

Aerosol Chemistry Nanoparticle Physics, Biomolecule Mass Spectrometry with VUV radiation, Institute of Eco-Environment, Beijing, China, July 2007
Aerosol Chemistry Nanoparticle Physics, Biomolecule Mass Spectrometry with VUV radiation, NSLS users meeting, Dalian, China, July 2007

Visualizing photoionization dynamics on nanoparticles with synchrotron radiation, 22nd International Symposium of Molecular Beams, Freiburg, Germany, May 2007

Probing aerosol chemistry and nanoparticle physics with vacuum-ultraviolet radiation, Chemistry Department seminar, Argonne National Labs, Argonne, IL, Feb. 2007

Probing Atoms to Aerosols with Synchrotron VUV radiation PITTCON, Chicago, IL, Feb. 2007

Investigating Atoms to Aerosols with Vacuum Ultraviolet Radiation, Condensed Phase, Interfaces and Molecular Sciences (CPIMS) DOE contractors meeting, Arlington, VA, Oct. 2006.

Past, present & future multicolor experiments at the ALS, Multicolor scientific opportunities at CIRCE and ALS workshop, ALS user meeting, Oct. 2006

Conducting State-of-the Art Chemical Physics at a Synchrotron, 2nd Jordanian workshop – SESAME in research, training and technological applications, Amman, Jordan, Sep 2006

Vacuum-Ultraviolet photoionization of fragile molecules, 10th Post-ionization Techniques in Surface Analysis workshop, Bommerholtz, Germany, Sep 2006

Photoionization studies of astrochemically relevant molecules, Astrochemistry - From Laboratory Studies to Astronomical Observations, Pacifichem, Hawaii, Dec 2005

Vacuum ultraviolet photoionization studies of biomolecules. Photophysical Dynamics in Biological Molecules Pacifichem, Hawaii, Dec 2005

Photoelectron imaging of nanoparticles. Frontiers in Structural and Functional Studies of Atomic and Molecular Clusters and Nano-particles, Pacifichem, Hawaii, Dec 2005

Single-Photon Ionization with Vacuum-Ultraviolet (VUV) Radiation, Chemistry department seminar, Penn State University, College Station, Oct 2005

VUV Interactions with Nanoparticles, Chemistry department seminar, University of Manchester, UK, Sep 2005

Photoelectron Imaging of Nanoparticles. 354. WE-Heraeus-Seminar "Structure and Dynamics of Free Clusters and Nanoparticles using Short Wavelength Radiation". Bad Honnef, Germany, Sep 2005

VUV photoionization of the building blocks of life, 21st International Symposium of Molecular Beams, Crete, Greece, May 2005

Interaction of nanoparticles with VUV light. Laboratoire de Chimie Physique, Université Paris Sud, Orsay, France, March 2005

Interaction of nanoparticles with VUV light. Laboratoire de Spectrometrie Ionique et Moleculaire, University of Lyon, France, March 2005

Interaction of nanoparticles with VUV light. Laboratoire Francis Perrin, CEA SACLAY, Orsay, France, March 2005

Interaction of nanoparticles with VUV light. Department of Chemistry, University of Hawaii, February 2005

Interaction of nanoparticles with VUV radiation. ALS SSG seminar series, LBNL, Berkeley, January 2005

Photoelectron imaging of nanoparticles," Chemistry Department seminar, University of California at Davis, Davis, CA, November 2004

Photoelectron imaging of nanoparticles," AMO seminar, Department of Physics, University of California at Berkeley, Berkeley, CA, October 2004

Atoms to aerosols, The Chemical Dynamics Beamline at the Advanced Light Source, Seminar, Combustion Research Facility, Sandia, CA, August 2004

Cutting edge science to real world applications, The Chemical Dynamics Beamline," National Organization of Black Chemists and Chemical Engineers (NOBCCHE), Annual meeting, San Diego, CA, April 2004

Flames, DNA, & lasers, Chemical physics at the Advanced Light Source, National Society of Black Physicists (NSBP), Washington DC, February 2004

Particle beam delivery systems for ultra-fast light sources, LCLS Instrumentation workshop, SLAC, Stanford University, Palo Alto, CA, February 2004

Flames, DNA, & lasers, Chemical physics at the Advanced Light Source, ALS SSG seminar series LBNL, Berkeley, CA, November 2003

Flames, DNA, & lasers, Chemical physics at the Advanced Light Source, National Organization of Black Chemists and Chemical Engineers (NOBCCHE), Indianapolis, April 2003

Reaction dynamics using synchrotron radiation. 223th ACS National Meeting, Orlando, FL, April 2002

Imaging in chemical dynamics in conjunction with synchrotron radiation. ACS National Meeting, Pacifichem 2000, Hawaii, December 2000

Velocity Map Imaging Studies of Reaction Dynamics. ACS western regional meeting, San Francisco, October 2000

Velocity Map Imaging Studies of Reaction Dynamics. Symposium on Imaging in Chemical Dynamics, ACS National Meeting, New Orleans, August 1999

Velocity Map Imaging Studies of Reaction Dynamics. Photoionization workshop, ICPEAC, Okazaki, Japan, July 1999

Publications

128. D. S. N. Parker, R. I. Kaiser, O. Kostko, T. Troy, M. Ahmed, B. J. Sun, S. H. Chen, and A. H. Chang, "On the Formation of Pyridine in the Interstellar Medium," Phys. Chem. Chem. Phys. (2015, accepted) DOI: 10.1039/C5CP02960K

127. K. N. Urness, Q. Guan, T. P. Troy, M. Ahmed, J. W. Dailey. G. B. Ellison, and J. M. Simmie, "*Pyrolysis Pathways of the Furanic Ether 2-Methoxyfuran,*" J. Phys. Chem. A. (2015, accepted) DOI: 10.1021/acs.jpca.5b06779

126. A. K. Perras, B. Daum, C. Ziegler, L. Takahashi, M. Ahmed, G. Wanner, A. Klingl, G. Leitinger, D. Kolb-Lenz, S. Gribaldo, A. Auerbach, M. Mora, A. J. Probst, A. Bellack, C. Moissl-Eichinger, "*S-layers at second glance? Altiarchaeal grappling hooks (hami) resemble arhaeal S-layer proteins in structure and sequence,"* Front. Microbiol. (2015, accepted) DOI: 10.3389/fmicb.2015.00543

125. D. S. N. Parker, R. I. Kaiser, O. Kostko, and M. Ahmed, "*Selective Formation of Indene via the Reaction of Benzyl Radicals with Acetylene*," Chem. Phys. Chem. (2015) **16**, 2091, DOI: 10.1002/cphc.201500313

124. B. Bandyopadhyay, O. Kostko, Y. Fang, and M. Ahmed, "*Probing Methanol Cluster Growth by Vacuum Ultraviolet Ionization*," J. Phys. Chem. A. (2015) **119**, 4083, DOI: 10.1021/acs.jpca.5b00912

123. Z. Liu, N. Destouches, G. Vitrant, Y. Lefkir, T. Epicier, F. Vocanson, S. Bakhti, Y. Fang, B. Bandyopadhyay, and M. Ahmed, *"Understanding the Growth Mechanisms of Ag Nanoparticles Controlled by Plasmon-Induced Charge Transfers in Ag-TiO_2 Films*," J. Phys. Chem. C. (2015) **119**, 9496, DOI: 10.1021/acs.jpcc.5b01350

122. T. K. Ormond, P. Hemberger, T. P. Troy, M Ahmed, J. F. Stanton, and G. B. Ellison, "*The Ionization Energy of Cyclopentadienone: A Photoelectron-Photoion Coincidence Study*," Mol. Phys., (2015) **113**, 2350, DOI: 10.1080/00268976.2015.1042936

121. D. S. N. Parker, R. I. Kaiser, B. Bandyopadhyay, O. Kostko, T. P. Troy, and M. Ahmed, "*Unexpected Chemistry from the Reaction of Naphthyl and Acetylene at Combustion-Like Temperatures*," Angew. Chem. Int. Ed. (2015) **127**, 5511, DOI: 10.1002/anie.201411987

120. T. P. Troy, M. Ahmed, "*Rings of fire: Carbon combustion from soot to stars*," Phys. Today, (2015) **68**, 62, DOI: 10.1063/PT.3.2729

119. D. S. N. Parker, R. I. Kaiser, O. Kostko, T. P. Troy, M. Ahmed, A. M. Mebel, and A. G. G. M. Tielens, "*Gas Phase Synthesis of (Iso)Quinoline and Its Role in the Formation of Nucleobases in the Interstellar Medium*," Astrophys. J. (2015) **803**, 53, DOI: 10.1088/0004-637X/803/2/53

118. T. K. Ormond, A. M. Scheer, M. R. Nimlos, D. J. Robichaud, T. P. Troy, M. Ahmed, J. W. Daily, T. L. Nguyen, J. F. Stanton, and G. B. Ellison, "*Pyrolysis* of *Cyclopentadienone: Mechanistic Insights From a Direct Measurement of Product Branching Ratios,"* J. Phys. Chem. A. (2015) **119**, 7222, DOI: 10.1021/jp511390f

117. P. T. Lynch, T. P. Troy, M. Ahmed, and R.S. Tranter, *"Probing Combustion Chemistry in a Miniature Shock Tube with Synchrotron VUV Photo Ionization Mass Spectrometry,"* Anal. Chem. (2015) **87**, 2345, DOI: 10.1021/ac5041633

116. G. T. Buckingham, T. K. Ormond, J. P. Porterfield, P. Hemberger, O. Kostko, M. Ahmed, D. J. Robichaud, M. R. Nimlos, **J.** W. Daily, and G. B. Ellison, "*The thermal decomposition of the benzyl radical in a heated micro-reactor. I. Experimental findings,"* J. Chem. Phys. (2015) **142**, 044307, DOI: 10.1063/1.4906156

115. D. S. N. Parker, R. I. Kaiser, T. P. Troy, O. Kostko, M. Ahmed, and A. M. Mebel, "*Toward the Oxidation of the Phenyl Radical and Prevention of PAH Formation in Combustion Systems*," J. Phys. Chem. A. (2015), **119**, 7145, DOI: 10.1021/jp509170x

114. S. Chakraborty, B. H. Muskatel, T. L. Jackson, M. Ahmed, R. D. Levine, and M. H. Thiemens, *"Massive isotopic effect in vacuum UV photodissociation of N_2 and implications for meteorite data,"* PNAS (2014) **111**, 14704, DOI:10.1073/pnas.1410440111

113. S. Y. Liu, M. Shawkey, D. Parkinson, T. Troy and M. Ahmed, "*Elucidation of the chemical composition of avian melanin*," RSC Advances (2014), **4**, 40396, DOI: 10.1039/C4RA06606E

112. S. Neppl, A. Shavorskiy, I. Zegkinoglou, M. Fraund, D. S. Slaughter, T. Troy, M. P. Ziemkiewicz, M. Ahmed, S. Gul, B. Rude, J. Z. Zhang, A. S. Termsin, P-A. Glans, Y-S. Liu, C. H. Wu, J. Guo, M. Salmeron, H. Bluhm, and Oliver Gessner, "*Capturing interfacial photo-electrochemical dynamics with picosecond time-resolved X-ray photoelectron spectroscopy*," Faraday Discuss. (2014), **171**, 219, DOI: 10.1039/C4FD00036F

111. D. S. N. Parker, R. I. Kaiser, T. P. Troy, and M. Ahmed, "*Hydrogen abstraction-acetylene addition revealed*," Angew. Chem. Int. Ed. (2014) **53**, 7740, DOI: 10.1002/anie.201404537

110. J. B. Randazzo, P. Croteau, O. Kostko, M. Ahmed and K. A. Boering, *"Isotope effects and spectroscopic assignments in the non-dissociative photoionization spectrum of N_2,"* J. Chem. Phys. (2014) **140**, 194303

109. H-W. Chang, C-C. Hsu, M. Ahmed, S-Y. Liu, Y. Fang, J. Seog, G. S. Oehrlein, and D. B. Graves, "*Plasma Flux Dependent Lipid A Deactivation*," J. Phys. D: Appl. Phys. (2014) **47** 224015

108. M. Perera, K. M. Roenitz, R. B. Metz, O. Kostko, and M. Ahmed, "*VUV photoionization measurements and electronic structure calculations of the ionization energies of gas-phase tantalum oxides TaOx (x=3-6)*," J. Spectrosc. Dyn. (2014) **4**, 21

107. C. Bhardwaj, Y. Cui, T. Hofstetter, S. Y. Liu, H. C. Bernstein, R. P. Carlson, M. Ahmed and L. Hanley, "*Differentiation of Microbial Species and Strains in Coculture Biofilms by Multivariate Analysis of Laser Desorption Postionization Mass Spectra",* Analyst (2013) **138,** 6844

106. F. Bell, Q. N. Ruan, A. Golan, P. R. Horn, M. Ahmed, S. R. Leone, and M. Head-Gordon, "*Dissociative Photoionization of Glycerol and its Dimer Occurs Predominantly via a Ternary Hydrogen-Bridged Ion-Molecule Complex*," J. Am. Chem. Soc. (2013) **135**, 14229

105. K. N. Urness, Q. Guan, A. Golan, J. W. Daily, M. R. Nimlos, J. F. Stanton, M. Ahmed, and G. B. Ellison, "*Pyrolysis of Furan in a Microreactor*," J. Chem. Phys., (2013) **139**, 124305

104. K. Khistyaev, A. Golan, K. B. Bravaya, N. Orms, A. I. Krylov, and M. Ahmed, "*Proton transfer in nucleobases is mediated by water*," J. Phys. Chem. A. (2013) **117**, 6789

103. S-Y. Liu, M. Kleber, L. K. Takahashi, P. Nico, M. Keiluweit, M. Ahmed, *"Synchrotron based mass spectrometry to investigate the molecular properties of mineral-organic associations,"* Anal. Chem. (2013) **85**, 6100

102. S. Chakraborty, T. L. Jackson, M. Ahmed, and M. H. Thiemens, *"Sulfur Isotopic Fractionation in Vacuum Ultraviolet Photodissociation of Hydrogen Sulfide: Potential Relevance to Meteorite Analysis,"* PNAS (2013) **110** 17650

101. M. Perera, R. B. Metz, O. Kostko, and M. Ahmed, *"Vacuum Ultraviolet Photoionization Studies of $PtCH_2$ and H-Pt-CH_3: A Potential Energy Surface for the Pt + CH_4 Reaction,"* Angew. Chem. Int. Ed. (2013) **125**, 922

100. A. Golan, M. Ahmed, A. M. Mebel, and R. I. Kaiser, *"A VUV Photoionization Study on the Formation of Primary and Secondary Products in the Reaction of the Phenyl Radical with 1,3-Butadiene under Combustion Relevant Conditions,"* Phys. Chem. Chem. Phys., (2013) **15**, 341

99. R. I. Kaiser, S. P. Krishtal, A. M. Mebel, O. Kostko, and M. Ahmed, *"An Experimental and Theoretical Study on the Ionization Energies of SiC_2H_x (x = 0, 1, 2) Isomers,"* Astrophys. J. (2012) **761**, 178

98. A. Golan and M. Ahmed, *"Molecular beam mass spectrometry with tunable vacuum ultraviolet (VUV) synchrotron radiation,"* J. Vis. Exp. (2012) **68**, e50164

97. K. S. Kalogerakis, C. Romanescu, M. Ahmed, K. R. Wilson, and T. G. Slanger, *"CO prompt emission as a CO2 marker in comets and planetary atmospheres,"* Icarus (2012) **220**, 205

96. A.G. Vasiliou, K. M. Piech, B. Reed, X. Zhang, M. R. Nimlos, M. Ahmed, A. Golan, O. Kostko, D. L. Osborn, J. W. Daily, J. F. Stanton, and G. B. Ellison, *"Thermal Decomposition of CH3CHO Studied by Matrix Infrared Spectroscopy and Photoionization Mass Spectroscopy,"* J. Chem. Phys., (2012) **137**, 164308

95. F. Zhang, R.I. Kaiser, A. Golan, M. Ahmed and N. Hansen, "*A VUV Photoionization Study of the Combustion-Relevant Reaction of the Phenyl Radical (C6H5) with Propylene (C3H6) in a High Temperature Chemical Reactor,"* J. Phys. Chem. A (2012) **116**, 3541

94. S. Chakraborty, R. Davis, M. Ahmed, T. L. Jackson, and M. H. Thiemens "*Oxygen isotope fractionation in vacuum ultraviolet photodissociation of carbon monoxide: Wavelength, pressure and temperature dependency,"* J. Chem. Phys. (2012) **137**, 024309

93. A. Golan, K. B. Bravaya, R. Kudirka, O. Kostko, S. R. Leone, A. I. Krylov, and M. Ahmed. *"Ionization of stacked dimethyluracil dimers leads to facile proton transfer in the absence of H-bonds,"* Nature Chem. (2012) **4**, 323

92. A. Golan and M. Ahmed, "*Ionization of water clusters mediated by exciton energy transfer from argon clusters,"* J. Phys. Chem. Lett. (2012) **3**, 458

91. M. J. Berg, K. R. Wilson, C. Sorensen, A. Chakrabarti, and M. Ahmed, "*Discrete Dipole Approximation Model for Low-Energy Photoelectron Emission from NaCl Nanoparticles,"* J. Quant. Spectrosc. Radiat. Transfer (2012) **113**, 259

90. D. Ghosh, A. Golan, L. Takahashi, A.I. Krylov and M. Ahmed *"A VUV photoionization and Ab initio determination of the ionization energy of a gas-phase sugar (deoxyribose),"* J. Phys. Chem. Lett. (2012) **3**, 97

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