

SHAN-HU LEE, PhD**EDUCATION**

Beijing University of Chemical Technology, China

B.S. Chemistry, Analytical Chemistry

1985 – 1989

University of Tokyo, Japan

M.S. Physical Chemistry (Advisor, Prof. Ken-Ichi Tanaka)

1992 -1994

Thesis: Adsorption and desorption of NO on well-defined single crystal Pt₃CO (100) surfaces**University of Tokyo, Japan**

Ph.D. Physical/Atmospheric Chemistry (Advisor, Prof. Hajime Akimoto)

1994 -1997

Dissertation: Development of laser ionization mass spectrometry for tropospheric low NO concentrations

APPOINTMENTS

University of Alabama in Huntsville, Department of Atmospheric Sciences

Associate Professor

2015 – present

Kent State University, Department of Environmental Health Sciences and Department of Chemistry

Professor

2012 – 2015

Associate Professor

2009 – 2012

Assistant Professor

2005 – 2009

University of Denver, Department of Engineering

Senior Research Scientist

2001 – 2005

National Oceanic and Atmospheric Administration, Aeronomy Laboratory

Postdoctoral Fellow

1999 – 2001

Project: Single particle mass spectrometer measurements during the 1999 Atlanta SuperSites Experiments (Advisor: Fred Fehsenfeld)

MIT, Department of Earth and Planetary Sciences

Postdoctoral Fellow

1998 -1999

Project: Heterogeneous reactions of HCl + ClONO₂ on ice surfaces (Advisor: Mario Molina)

DISTINCTIONS

2017-2019 Distinguished Professor, Fudan University
2017/18 Visiting Scholar, University of Delaware
2012 National Center for Atmospheric Research (NCAR) Advanced Study Program (ASP)
Visiting Faculty
2008-2011 Co-director of Choose Ohio First Scholarship
2009 Visiting Scientist, Stockholm University
2007 NSF CAREER Award
2006-2011 Co-director of NSF S-STEM Scholarship
2006-2009 KSU Academic Year and Summer Research and Creativity Activity Awards
2002 NASA CRYSTAL-FACE Science Team Award
1996-1997 Japan Society for Promotion of Sciences (JSPS) Young Scientist Fellow

PROFESSIONAL SOCIETIES

American Meteorology Society (AMS)
American Geophysical Union (AGU)
American Association of Aerosol Research (AAAR)
American Chemical Society (ACS)

PUBLICATIONS

Research ID F-9913-2014

Number of referred research publications = 51

Google scholar H-index factor = 29

Number of papers cited more than 100 times = 8

Publications are cited in Nature, Science, and PNAS more than 100 times.

Students and postdocs that Dr. Lee advised.

**Corresponding author*

Xu, J., J. Chen, Y. Shi, N. Zhao, X. Qin, G. Yu, J. Liu, Y. Lin, Q. Fu, R. J. Weber, **S.-H. Lee**, C. Deng, K. Huang*, First continuous measurement of gaseous and particulate formic acid in a suburban area of East China: Seasonality and gas-particle partitioning, *ACS Earth Space Chem.*, 4, 157–167 (2020).

Tiszenekel, L., C. Stangl, J. Krasnomowitz, Q. Ouyang, H. Yu, M. J. Apsokardu, M. V. Johnston, **S.-H. Lee***, Temperature effects on sulfuric acid aerosol nucleation and growth: Initial results from the TANGENT study, *Atmos. Chem. Phys.*, 19, 8915–8929 (2019).

*** Cited in Nat. Protoc. 15, 1013–1040 (2020).*

Lee, S.-H.,* H. Gordon, H. Yu, K. Lehtipalo, R. Haley, Y. Li, and R. Zhang,, New particle formation in the atmosphere: From molecular clusters to global climate, *J. Geophys. Res.*, 124, Doi:10.1029/2018JD029356 (2019).

*** Invited contribution for a special issue on the AGU's Centennial Grand Challenges in the Earth and Space Sciences.*

*** Cited in PNAS, 117, 3427-3432 (2020).*

H. Yu*, L. Ren, X. Huang, M. Xie, J. He, **S.-H. Lee** and H. Xiao, Iodine speciation and size distribution in ambient aerosols at a coastal new particle formation hotspot in China, *Atmos. Chem. Phys.*, 19, 4025–4039 (2019).

Stangl, C. M., J. M. Krasnomowitz, M. J. Apsokardu, L. Tiszenekel, Q. Ouyang, **S.-H. Lee**, M. V. Johnston*, Sulfur dioxide modifies aerosol particle growth by monoterpene ozonolysis, *J. Geophys. Res.*, 124, Doi:10.1029/2018JD030064 (2019).

*** Cited in Nat. Protoc. 15, 1013–1040 (2020).*

Krasnomowitz, J. M., M. J. Apsokardu, C. M. Stangl, L. Tiszenekel, Q. Ouyang, **S.-H. Lee**, M. V. Johnston*, Growth of Aitken mode ammonium sulfate particles by α -pinene ozonolysis, *Aerosol Sci. Technol.*, 53, 406-418, Doi:10.1080/02786826.2019.1568381 (2019).

*** Cited in Nat. Protoc. 15, 1013–1040 (2020).*

Dai, L., H. Wang, L. Zhou, J. An*, L. Tang, C. Lu, W. Yan, R. Liu, S. Kong, M. Chen, **S.-H. Lee** and H. Yu*, Regional and local new particle formation events observed in the Yangtze River Delta region, China, *J. Geophys. Res.*, Doi:10.1002/2016JD026030 (2017).

Kontkanen, J.*, K. Lehtipalo, L. Ahonen, J. Kangasluoma, H. E. Manninen, J. Hakala, C. Rose, K. Sellegri, S. Xiao, L. Wang, X. Qi, W. Nie, A. Ding, H. Yu, **S.-H. Lee**, V.-M. Kerminen, T. Petaja, and M. Kulmala, Global view on atmospheric concentrations of sub-3 nm particles measured with the Particle Size Magnifier, *Atmos. Chem. Phys.*, Doi:10.5194/acp-2016-847 (2017).

Yu, H.*, L. Dai, V. P. Kanawade, S. N. Tripathi, X. Ge, M. Chen, and **S.-H. Lee**,* Temperature and RH dependence of aerosol nucleation and growth rates of sub-3 nm particles, *J. Geophys. Res.*, Doi:10.1029/2016JD025619 (2017).

*** Cited in Sci. Adv., 4, 1-9 (2018); Nat. Protoc. 15, 1013–1040 (2020).*

Lee, S.-H.*, J. Uin, A. B. Guenther, J. A. de Gouw, F. Yu, A. B. Nadykto, J. Herb, N. L. Ng, A. Koss, W. H. Brune, K. Baumann, V. P. Kanawade, F. N. Keutsch, A. Nenes, K. Olsen, A. Goldstein, and Q. Ouyang, Isoprene suppression of new particle formation: Potential mechanisms and implications, *J. Geophys. Res.*, 121, Doi:10.1029/2016JD024844 (2016).

*** Cited in Nature, 565, 578-587 (2019); Nat. Commun., 10, 423 (2019).*

Hallar, A. G.*, A., R. Petersen, I. B. McCubbin, D. Lowenthal, **S.-H. Lee**, E. Andrews, and F. Yu, Climatology of New Particle Formation and Corresponding Precursors at Storm Peak Laboratory, *Aerosol Air Qual. Res.*, 16, 816–826 (2016).

Yu, F.*, G. Luo, S. C. Pryor, P. R. Pillai, **S. H. Lee**, J. Ortega, J. J. Schwab, A. G. Hallar, W. R. Leitch, V. P. Aneja, J. N. Smith, J. T. Walker, O. Hogrefe, and K. L. Demerjian: 2015, Spring and

summer contrast in new particle formation over nine forest areas in North America, *Atmos. Chem. Phys.*, 15, 13993–14003 (2015).

**** Cited in Science, Doi:10.1126/science.aaf2649 (2016); PNAS, Doi:10.1073/pnas.1602360113 (2016); npj Climat. Atmos. Sci., Doi:10.1038/s41612-018-0019-7 (2018).**

Guo, H.*, L. Xu, A. Bougiatioti, K. M. Cerully, S. L. Capps, J. R. Hite Jr., A. G. Carlton, **S.-H. Lee**, M. H. Bergin, N. L. Ng, A. Nenes, and R. J. Weber, Fine-particle water and pH in the southeastern United States, *Atmos. Chem. Phys.*, 15, 5211–5228 (2015).

**** Cited in PNAS, Doi: 10.1073/pnas.1508108113 (2015); PNAS, Doi: 10.1073/pnas.1510743112 (2015); Nature Geosci., Doi:10.1038/ngeo2665 (2016); Sci. Adv. DOI: 10.1126/sciadv.1601530 (2016); Sci Rep 7, 12109 (2017); Nat. Commun. 8, 15883 (2017).**

Xu, L., H. Guo, C. Boyd, M. Kleinc, A. Bougiatioti, K. Cerully, J. Hiteb, G. Isaacman, C. Knote, K. Olson, A. Koss, A. Goldstein, J. de Gouw, K. Baumann, **S.-H. Lee**, A. Nenes, R. Weber, N. L. Ng*, Effects of anthropogenic emissions on aerosol formation from isoprene and monoterpenes in the Southeastern United States, *Proc. Nat. Acad. Sci. USA*, Doi:10.1073/pnas.1417609112 (2014).

**** Cited in PNAS, Doi:10.1073/pnas.1508108113 (2015); PNAS, Doi: 10.1073/pnas.1510743112 (2015); Nat. Geosci., Doi:10.1038/ngeo2665 (2016); Science, Doi:10.1126/sciadv.1601530 (2016); PNAS, Doi:10.1073/pnas.1612430114 (2017); Sci. Rep. 7, 12109, (2017); Sci. Rep. 7, 15157, (2017); PNAS, 115 290–295 (2017); Nat. Geosci. 10, 490–495 (2017); PNAS 115, 2038–2043 (2018); Sci. Rep., 8, 535 (2018); Nature, 565, 578–587 (2019); npj Clim. Atmos. Sci. 2, 2 (2019).**

Yu, H.*, J. Ortega, J. N. Smith, A. B. Guenther, V. P. Kanawade, Y. You, Y. Liu, K. Hosman, T. Karl, R. Seco, S. G. Pallardy, L. Gu, J. Mikkilä and **S.-H. Lee***, New particle formation and growth in an isoprene-dominated Ozark forest: From sub-5 nm to CCN-Active sizes, *Aerosol Sci. Technol.*, 48, 1285–1298 (2014).

You, Y., V. P. Kanawade, J. A. de Gouw, A. B. Guenther, S. Madronich, M. R. Sierra-Hernandez, M. Lawler, J. N. Smith, S. Takahama, G. Ruggeri, A. Koss, K. Olson, K. Baumann, R. J. Webster, A. Nenes, H. Guo, E. S. Edgerton, L. Porcelli, W. H. Brune, A. H. Goldstein and **S.-H. Lee***, Atmospheric amines and ammonia measured with a chemical ionization mass spectrometer (CIMS), *Atmos. Chem. Phys.*, 14, 12181–12194 (2014).

**** Cited in Sci. Rep. Doi:10.1038/srep15842 (2015); Nat. Geosci., Doi:10.1038/ngeo2665 (2016);; Sci Rep 7, 12109 (2017).**

Kameel, F. R., **S.-H. Lee**, M. R. Hoffmann, and A. J. Colussi*, Polarity and oxidation level of visible absorbers in model organic aerosol, *Chem. Phys. Lett.*, 603, 57–61 (2014).

Chon, N. L., **S.-H. Lee*** and H. Lin*, A theoretical study of temperature dependence of cluster formation from sulfuric acid and ammonia, *Chem. Phys.*, 433, 60–66 (2014).

Yu, H., A. G. Haller, Y. You, A. Sedlacek, S. Springston, V. P. Kanawade, Y.-N. Lee, J. Wang, C. Kuang, R. L. McGraw, I. McCubbin, J. Mikkala, and **S.-H. Lee***, Sub-3 nm particles observed at the

coastal and continental sites in the United States, *J. Geophys. Res.*, 119, Doi:10.1029/2013JD020841 (2014).

Young, L.-H.*, **S.-H. Lee**, V. Kanawade, T.-C. Hsiao, Y. L. Lee, B.-F. Huang, Y.-J. Liou, H.-T. Hsu, and P.-J. Tsai, New particle growth and shrinkage observed in subtropical environments, *Atmos. Chem. Phys.*, 13, 547-564 (2013).

Lee, S.-H.*, S. Murkherjee, B. Brewer, R. Ryan, H. Yu and M. Gangoda, A Laboratory experiment to measure Henry's law constants of volatile organic compounds with a bubble column and GC-FID, *J. Chem. Edu.*, 90, 495-499, Doi:10.1021/ed200303x (2013).

Kanawade, V., D. R. Benson, **S.-H. Lee***, Statistical analysis of 4-year observations of aerosol sizes in a semi-rural continental environment, *Atmos. Environ.*, 59, 30-38 (2012).

Yu, H. and **S.-H. Lee***, Chemical ionization mass spectrometry for the measurement of atmospheric amines, *Environ. Chem.*, 9, 190-210, Doi:10.1071/EN12020 (2012).

*** Invited article for the special issue on Mass Spectrometric Approaches for Atmospheric Aerosols.*

*** Cited in Nature 502, 359-363 (2013).*

Lee, S.-H.* and H. C. Allen*, Analytical measurements of atmospheric urban aerosol, *Anal. Chem.*, 84, 1196-1201, Doi: 10.1021/ac201338x (2012).

*** Invited feature article and the cover article of the February 7, 2012 issue.*

Yu, H., R. McGraw, and **S.-H. Lee***, Effects of amines on formation of atmospheric sub-3 nm particles and their subsequent growth, *Geophys. Res. Lett.*, 39, L02807, Doi: 10.1021/2011GL050099 (2012).

*** Cited in PNAS, Doi:10.1073/pnas.1210285109 (2012); PNAS, Doi: 10.1073/pnas.1211878109 (2012); Nature 502, 359-363 (2013); Nature Commun., Doi:10.1038/ncomms11594 (2016); Sci. Adv., 4, eaau5363 (2018); Nat. Protoc. 15, 1013–1040 (2020).*

Kanawade, V. P.*, B. T. Jobson, A. B. Guenther, M. E. Erupe, S. N. Pressely, T. Tripathi, and **Lee, S.-H.**, Isoprene suppression of new particle formation in a mixed deciduous forest, *Atmos. Chem. Phys.*, 11, 6013-6027 (2011).

*** Cited in Science 237, 1075 (2012); Nature, 565, 578-587 (2019).*

Erupe, M. E., A. A. Viggiano, and **S.-H. Lee***, The effect of trimethylamine in atmospheric nucleation involving H₂SO₄, *Atmos. Chem. Phys.*, 11, 4767-4775 (2011).

*** Cited in Nature 502, 359-363 (2013); PNAS, Doi:10.1073/pnas.1404853111 (2014); Nature Communication, Doi:10.1038/ncomms11594 (2016); Science, Doi: 10.1126/science.aaf2649 (2016); Nat Protoc 15, 1013–1040 (2020).*

Benson, D. R., H. Yu, A. Markovich, **S.-H. Lee***, Ternary homogeneous nucleation of H₂SO₄, NH₃, and H₂O under conditions relevant to the lower troposphere, *Atmos. Chem. Phys.*, 11, 4755-4766 (2011).

**** Cited in *Nature Education Knowledge*, 4, 1 (2013); *Science*, Doi: 10.1126/science.aaf2649 (2016); *Nat Protoc* 15, 1013–1040 (2020).**

Erupe, M. E., D. R. Benson, J. Li, L.-H. Young, B. Verheggen, M. Al-Refai, O. Tahboub, V. Cunningham, F. Frimpong, A. A. Viggiano and S.-H. Lee*, Correlation of aerosol nucleation rate with sulfuric acid and ammonia in Kent Ohio: An atmospheric observation, *J. Geophys. Res.*, 115, D23216, Doi:10.1029/2010JD013942 (2010).

**** Cited in *PNAS*, Doi:10.1073/pnas.1200878109 (2012).**

Benson, D. R., M. Al-Refai, A. Markovich, and S.-H. Lee*, Chemical ionization mass spectrometry for ambient measurements of ammonia, *Atmos. Meas. Tech.*, 3, 1075–1087 (2010).

Benson, D. R., M. E. Erupe, and S.-H. Lee*, Laboratory-measured H₂SO₄-H₂O-NH₃ ternary homogeneous nucleation rates: Initial observations, *Geophys. Res. Lett.*, 36, L15818, Doi:10.1029/2009GL038728 (2009).

**** Cited in *Science*, Doi:10.1126/science.1180315 (2010); *PNAS*, Doi:10.1073/pnas.0910125106 (2009); *PNAS*, Doi:10.1073/pnas.0911330107 (2010); *PNAS*, Doi:10.1073/pnas.1210285109 (2012); *Nat Protoc* 15, 1013–1040 (2020).**

Wilson, J. C.*, S.-H. Lee, J. M. Reeves, C. A. Brock, H. H. Jonsson, B. G. Lafleur, M. Loewenstein, J. Podolske, E. Atlas, S. Wofsy, K. Boering, G. Toon, D. Fahey, K. K. Kelly, P. Bui, G. Diskin, G. Sachse, The establishment of steady-state aerosol distributions in the extra-tropical, lower stratosphere and the processes that maintain them, *Atmos. Chem. Phys.*, 8, 6617–6626 (2008).

Young, L.-H., D. R. Benson, F. R. Kameel, J. R. Pierce, H. Junninen, M. Kulmala, S.-H. Lee*, Laboratory studies of sulfuric acid and water binary homogeneous nucleation: Evaluation of the laboratory setup and the preliminary results, *Atmos. Chem. Phys.*, 8, 1–20 (2008).

**** Cited in *Science* 328, 1366–1367 (2010); *PNAS* 10.1073/pnas.0911330107 (2009); *PNAS* 10.1073/pnas.0910125106 (2009); *Science* 327, 1243–1246 (2010); *Science*, Doi:10.1126/science.1243527 (2014); *Nat Protoc* 15, 1013–1040 (2020).**

Junninen, H.*, M. Hultkonen, I. Riipinen, T. Nieminen, A. Hirsikko, T. Suni, M. Boy, S.-H. Lee, M. Vana, H. Tammet, M. Kulmala, Observations on night time growth of atmospheric clusters, *Tellus*, 60B, 365–371 (2008).

**** Cited in *Nature Commun.*, Doi:10.1038/ncomms8003 (2015); *Sci. Adv.*, Doi: 10.1126/sciadv.aar5218 (2018).**

Benson, D. R., L.-H. Young, S.-H. Lee*, T. Campos, J. Jenson, The effects of air mass history in new particle formation in the free troposphere, *Atmos. Chem. Phys.*, 8, 3015–3024 (2008).

Benson, D. R., L.-H. Young, F. R. Kameel, S.-H. Lee*, Laboratory-measured sulfuric acid and water homogeneous nucleation rates from the SO₂ + OH Reaction, *Geophys. Res. Lett.*, 35, L11801, Doi:10.1029/2008GL033387 (2008).

**** Cited in *PNAS* 10.1073/pnas.0911330107 (2009); *PNAS* 10.1073/pnas.0910125106 (2009); *Science* 327, 1243–1246 (2010); *Science*, Doi: 10.1126/science.1189732 (2010); *Nat Protoc* 15, 1013–1040 (2020).**

Lee, S.-H.*, L.-H. Young, D. R. Benson, M. Kulmala, H. Junninen, T. Suni, T. L. Campos, D. C. Rogers, J. Jensen, Observations of nighttime new particle formation in the troposphere, *J. Geophys. Res.*, 112, D10210, Doi: 10.1029/2007jd009351 (2008).

**** Cited in Nature**, Doi:10.1038/nature17953, (2016); *Sci. Rep.* 7, 45707 (2017).

Young, L.-H., D. R. Benson, W. M. Montanaro, **S.-H. Lee***, L. L. Pan, D. C. Rogers, J. Jensen, J. L. Stith, C. A. Davis, T. L. Campos, K. P. Bowman, W. A. Cooper, Enhanced new particle formation observed in the northern midlatitude tropopause region, *J. Geophys. Res.*, 112, D10218, Doi:10.1029/2006JD008109 (2007).

Hunton, D. E.* , A. A. Viggiano, T. M. Miller, J. O. Ballenthin, J. M. Reeves, J. C. Wilson, **S.-H. Lee**, B. E. Anderson, W. H. Brune, H. Harder, J. B. Simpas, and N. Oskarsson, In-situ aircraft observations of the 2000 Mt. Hekla volcanic cloud: Composition and chemical evolution in the Arctic lower stratosphere, *J. Volcanol. Geotherm. Res.*, 145, 23-34 (2005).

**** Cited in Scientific Reports**, Doi:10.1038/srep12243 (2015); *PNAS*, Doi:10.1073/pnas.1619318114 (2017).

Lee, S.-H.*, J. C. Wilson, D. Baumgardner, R. L. Herman, E. M. Weinstock, B. G. LaFleur, G. Kok, B. Anderson, P. Lawson, B. Baker, A. Strawa, J. V. Pittman, J. M. Reeves, and T. P. Bui, New particle formation observed in the tropical/subtropical cirrus clouds, *J. Geophys. Res.*, 109, Doi:10.1029/2004JD005033 (2004).

**** Cited in Science Perspective article**, *Science*, 314, 1399-1402 (2006).

Lee, S.-H.*, J. M. Reeves, J. C. Wilson, D. E. Hunton, A. A. Viggiano, T. M. Miller, J. O. Ballenthin, and L. R. Lait, Particle formation by ion nucleation in the upper troposphere and lower stratosphere, *Science*, 301, 1886-1889 (2003).

**** Featured in This Week in Science** [*Science* 301, 1809 (2003)].

**** Cited in Science** 302, 1000-1001 (2003); *Science* 304, 1487-1490 (2004); *Science* 307, 698-700 (2005); *PNAS* 103, 10554-10559 (2006); *Science*, 318, 89-92 (2007); *PNAS* 10.1073/pnas.0910125106 (2009); *Nature Geoscience*, Doi:10.1038/ngeo778 (2010); *Nature*, 476, 249-433 (2011); *Nature*, Doi:10.1038/nature19819 (2016); *Science*, Doi:10.1126/science.aaf2649 (2016); *PNAS*, 116, 22540-22544 (2019).

Lee, S.-H.*, D. M. Murphy, D. S. Thomson, and A. M. Middlebrook, Nitrate and oxidized organics in single particle mass spectra during the 1999 Atlanta Supersites project, *J. Geophys. Res.*, 108, Doi:10.1029/2001JD001455 (2003).

Middlebrook, A. M.* , D. M. Murphy, **S.-H. Lee**, D. S. Thomson, K. A. Prather, R. J. Wenzel, D.-Y. Liu, D. J. Phares, K. Rhoads, A. S. Wexler, M. V. Johnston, J. L. Jimenez, J. T. Jayne, D. R. Worsnop, I. Yourshaw, J. H. Seinfeld, and R. C. Flagan, A comparison of particle mass spectrometers during the 1999 Atlanta SuperSite Experiments, *J. Geophys. Res.*, 108, Doi:10.1029/JD2001000660 (2003).

**** Cited in PNAS**, Doi:10.1073/pnas.1803295115 (2018).

Lee, S.-H.*, D. M. Murphy, D. S. Thomson, and A. M. Middlebrook, Chemical components of single particles measured using particles analysis by laser mass spectrometer (PALMS) during the 1999 Atlanta SuperSite Experiment: focus on organic/sulfate, Pb, soot, and mineral particles, *J. Geophys. Res.*, 107, Doi:10.1029/2001JD000011 (2002).

*** Cited in Nature Geoscience, Doi:10.1038/ngeo1353 (2012); PNAS, Doi:10.1073/pnas.1206414109 (2012).*

Lee, S.-H.*, Y. Kajii, and H. Akimoto, Improvement of the new NO detection method using laser induced two photon ionization with a mass spectrometer, *Environ. Sci. Technol.*, 34, 4434-4438 (2000).

Lee, S.-H.*, D. C. Leard, R. Zhang, L. T. Molina, and M. J. Molina, The HCl + ClONO₂ reaction rate on various water ice surfaces, *Chem. Phys. Lett.*, 315, 7-11 (1999).

Lee, S.-H.*, H. Akimoto, H. Nakane, S. Kurnosenko, and Y. Kinjo, Lower tropospheric ozone trend observed in 1989-1997, *Geophys. Res. Lett.*, 25, 1637-1640 (1998).

*** Highlighted in the current issue 25(10) of Geophys. Res. Lett.*

*** Cited in PNAS, 97, 10304-10306 (2000); PNAS 97, 9875-9880 (2000); Science 304, 1483-1487 (2004).*

Lee, S.-H.*, J. Hirokawa, Y. Kajii, and H. Akimoto, New method for measuring low NO concentrations using laser induced two photon ionization, *Rev. Sci. Instrum.*, 68, 2891-2897 (1997).

Lee, S.-H.*, and Y. Okawa, Changes of the Pt₃Co(100) surface stoichiometry with NO adsorption, *Surf. Sci. Lett.*, 338, 833-838, 1995.

BOOK CHAPTER

P. Hamill, C. Brogniex, L. Thomason, T. Deshler, L. C. Antuna, D. Baumgardner, R. Bevilacqua, C. A. Brock, C. David, M. Fromm, D. Fussen, M. Hervig, C. A. Hostettler, **S.-H. Lee**, J. Mrenethaler, M. T. Osborn, G. B. Roga, J. M. Reeves, J. Rosen, J. C. Wilson, Chapter 3: Instrument Description, in *Stratospheric Processes and Their Role in Global Climate (SPARC), A Project of WMO/ICSU/IOC World Climate Research Program: Assessment of Stratospheric Aerosol Properties (ASAP)*, Eds. L. Thomason, Th. Peter, SPARC Scientific Steering Group, February 2006.

COURSES TAUGHTS

University of Alabama in Huntsville (2015-present):

ATS690: Aerosols and Clouds (Graduate level) – developed myself

ATS690: In-situ Atmospheric Measurements (Graduate level) – developed myself

ATS520: Introduction to Atmospheric Chemistry (Graduate level)

ESS420: Introduction to Atmospheric Chemistry (Senior level)

ESS321: Pollution Problems (Junior level)

ESS111: Weather, Climate, and Global Change (Introductory level)

ESS111L: Weather, Climate, and Global Change Laboratory (Introductory level)

ATS780: Graduate Seminar
ATS781: Graduate Seminar
ESS780: Graduate Seminar
ESS781: Graduate Seminar

Kent State University (2005-2015):

EHS60195: Air Pollution (Graduate and Senior level) – developed myself
EHS60195: Toxicology (Junior) – developed myself
PH30102: Air Pollution and Pollution Control
CHEM70195: Mass Spectrometry (Graduate and Senior) – developed myself
CHEM71191: Problem Solving
CHEM61191: Problem Solving
CHEM40796: Individual Investigation
CHEM30103: Analytical Chemistry II (Junior)
CHEM30108: Analytical Chemistry Laboratory (Junior)
CHEM10030: Chemistry in Our World (Introductory chemistry course for non-science majors)
CHEM10062: General Chemistry Laboratory (Introductory)
Undergraduate Research Module Development
Chemistry for inner-city high school students at KSU Upward Bound Program

University of Denver (2001-2005):

CHEM3410: Atmospheric Chemistry (Senior/Graduate) – team teaching