

David S. Pinkston

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Education

Doctor of Philosophy (Analytical Chemistry), Purdue University, West Lafayette, IN;
Expected: Spring 2010

Dissertation: "Analysis of Petroleum Fractions by Using Laser-Induced Acoustic Desorption/
CIMn(H₂O)⁺ Chemical Ionization and Electron Ionization"
Advisor: Professor Hilka I. Kenttämää

Bachelor of Science, Catawba College, Salisbury, NC 2005

Graduated with College and Departmental Honors

Research Experience

Purdue University, West Lafayette, IN

Analytical Mass Spectrometry Research, 2005 - Present

- **High Resolution Mass Spectrometry: Fourier-transform Ion Cyclotron Resonance (FT-ICR):**
 - Utilized the chemical ionization reagent CIMn(H₂O)⁺ to determine molecular weight distributions and components' degrees of unsaturation for various petroleum fractions
 - Differentiated isomeric hydrocarbons via collision-activated dissociation (CAD) of their CIMn⁺ adducts
 - Demonstrated the ability to evaporate the heaviest petroleum fractions, including asphaltenes, via high-power laser-induced acoustic desorption (LIAD)
 - Determined the fragmentation patterns of several asphaltene model compounds upon electron ionization (EI) by using LIAD
 - Acquired the first EI mass spectrum of asphaltenes by using LIAD
 - Determined the molecular weight distributions of several asphaltenes via LIAD/EIMS
 - Compared the composition of asphaltenes originating from several different countries
 - In charge of the maintenance and troubleshooting of an FT-ICR.
 - Instructed incoming graduate students about the operation and maintenance of FT-ICR mass spectrometers
- **Linear Quadrupole Ion Trap Mass Spectrometry (LQIT):**
 - Utilized electrospray ionization (ESI) in a LQIT mass spectrometer for the determination of molecular weight distributions for asphaltenes
 - Isolated groups of asphaltene ions in LQIT and performed CAD to determine their fragmentation patterns and the source of aggregation for ESI-MS
- **Other Responsibilities:**
 - Successfully adapted a LIAD probe onto a 3 T FT-ICR
- **Collaborations:**
 - Participated in collaborative studies with Dr. Kuangnan Qian from ExxonMobil Research and Engineering Co., including preparation of progress reports and presentations on research focusing on the characterization of petroleum fractions by using LIAD/EIMS
 - Collaborated with Professors Peter Seidl from the Federal University of Rio de Janeiro and Murray Gray from University of Alberta on the composition of asphaltenes originating from different countries

Catawba College, Salisbury, NC

Chemistry Research, 2002 - 2005

- **High Performance Liquid Chromatography:**
 - Developed a HPLC method for acetaminophen, aspirin, pseudoephedrine, and caffeine separation and quantitation
- **Inductively Coupled Plasma Optical Emission Spectrometry:**
 - Determined the effect of bleach on gold jewelry
 - Determined the trace metal content of lead, nickel, and copper in soil
- **Scanning Tunneling Microscopy and Atomic Force Microscopy:**
 - Observed etching and corrosion effects of bleach on gold jewelry
- **Other Analytical Techniques:** familiar with
 - NMR spectroscopy
 - UV-Vis spectroscopy
 - IR spectroscopy
 - GC-MS
 - Atomic absorption
 - SPME
- **Responsibilities:**
 - Maintenance of HPLC and ICP instruments

Teaching Experience

Purdue University, Department of Chemistry, West Lafayette, IN,

Teaching Assistant, 2005 - 2007

- Graduate Teaching Assistant, General Chemistry

Honors, Awards, and Recognitions

- Catawba College First Family Scholarship Recipient (2001 - 2005)
- Member of College Honors Program at Catawba College (top 10% of students; 2001 - 2005)
- Catawba College Freshman Chemistry Award (2002)
- Member of Gamma Sigma Epsilon, Chemistry Honor Society (2003 - 2005)
- Catawba College Chemistry Prize (2004)
- Member of the Order of the Blue and White, Men's Honor Society (2004 - 2005)
- Member of Phi Epsilon, College Honor Society (2004 - 2005)
- Catawba College Dean's List (3 Semesters)
- Recipient of Bilsland Dissertation Fellowship (Spring 2010)

Activities

Undergraduate Studies

- Member of the American Chemical Society Student Affiliates (ACS-SA; 2002 - 2005)
- Vice President of ACS-SA (2003 - 2004)
- President of ACS-SA (2004 - 2005)
- Vice President of Gamma Sigma Epsilon (2004 - 2005)

Graduate Studies

- Member of the American Society for Mass Spectrometry (2005 - 2009)
- Member of Alpha Chi Sigma - Chemistry Honor Society (2005)
- Professional Member of Alpha Chi Sigma (2006 - 2009)
- Captain - Purdue University Hurling Club (2007 - 2009)

Publications

- **Pinkston, D.S.;** Duan, P.; Fu, M.; Habicht, S.C.; Kenttämaa, H.I. Differentiation of Isomeric Hydrocarbons by Using $\text{ClMn}(\text{H}_2\text{O})^+$ Chemical Ionization and Collision-activated Dissociation in a Fourier Transform Ion Cyclotron Resonance Mass Spectrometer. *In preparation.*
- **Pinkston, D.S.;** Gallardo, V.A.; Vinueza, N.R.; Habicht, S.C.; Qian, K.; Kenttämaa, H.I. Influence of Sample Preparation on Electrospray Ionization Mass Spectrometry of Asphaltenes. *In preparation.*

- **Pinkston, D.S.**; Duan, P.; Gallardo, V. A.; Habicht, S.C.; Tan, X.; Qian, K.; Gray M.; Müllen, K.; Kenttämaa, H.I. Laser-Induced Acoustic Desorption/Fourier Transform Ion Cyclotron Resonance Mass Spectrometry of Asphaltenes and Asphaltene Model Compounds. *Energy Fuels* **2009**, *23*, 5564-5570.
- Fu, M.; Duan, P.; Li, S.; Habicht, S.C.; **Pinkston, D.S.**; Vinueza, N.R.; Kenttämaa, H.I. Regioselective Ion-molecule Reactions for the Mass Spectrometric Differentiation of Protonated Isomeric Aromatic Diamines. *Analyst* **2008**, *133*, 452-454.
- Duan, P.; Qian, K.; Habicht, S.C.; **Pinkston, D.S.**; Fu, M.K.; Kenttämaa, H.I. Analysis of Base Oil Fractions by CIMn(H₂O)⁺ Chemical Ionization Combined with Laser-Induced Acoustic Desorption/Fourier Transform Ion Cyclotron Resonance Mass Spectrometry. *Anal. Chem.* **2008**, *80*, 1847-1853.
- Duan, P.G.; Fu, M.K.; **Pinkston, D.S.**; Habicht, S.C.; Kenttämaa, H.I. Gas Phase Reactions of CIMn(H₂O)⁺ with Polar and Nonpolar Hydrocarbons in a Mass Spectrometer. *J. Am. Chem. Soc.* **2007**, *129*, 9266-9267.

Presentations

- Petrophase 2009, Rio de Janeiro, Brazil (June 2009):
 - Poster Presentation: Novel Mass Spectrometric Methods for Characterization of Asphaltenes and Other Petroleum Products
- American Society for Mass Spectrometry Annual Conference on Mass Spectrometry and Allied Topics, Philadelphia, PA (June, 2009):
 - Oral Presentation: High-energy Laser-induced Acoustic Desorption/Fourier Transform Ion Cyclotron Resonance Mass Spectrometric Analysis of Heavy Petroleum Products
- American Society for Mass Spectrometry Annual Conference on Mass Spectrometry and Allied Topics, Denver, CO (June, 2008):
 - Oral Presentation: Analysis of Asphaltenes by Laser-Induced Acoustic Desorption/Fourier Transform Ion Cyclotron Resonance Mass Spectrometry
- American Society for Mass Spectrometry Annual Conference on Mass Spectrometry and Allied Topics, Indianapolis, IN (June, 2007):
 - Oral Presentation: Reactions of CIMn(H₂O)⁺ with Polar and Nonpolar Hydrocarbons in FT-ICR: Observation of H₂O Ligand Displacement without Dehydrogenation or Fragmentation
- 227th ACS National Meeting, San Diego, CA (March 2005):
 - Poster Presentation: Trace Metal Analysis of Soils From Different Sites in Salisbury, NC Using ICP-AES
- The Pittsburgh Conference on Analytical and Applied Spectroscopy, Chicago, IL (March 2004):
 - Poster Presentation: Kinetics Study of Gold Jewelry Interactions with Bleach Using AFM and ICP-AES
- The 101st North Carolina Academy of Science Meeting, Salisbury, NC (March 2004):
 - Poster Presentation: Analysis of Damage to Gold Alloys from Exposure to Bleach
- The Catawba College Interdisciplinary Symposium, Salisbury, NC:
 - Poster Presentation: Optimization of a HPLC Method for Analysis of Common OTC (April 2003)
 - Poster Presentation: Kinetics Study of Gold Jewelry Interactions with Bleach Using AFM and ICP-AES (April 2004)
 - Poster Presentation: Trace Metal Analysis of Soils From Different Sites in Salisbury, NC Using ICP-AES (April 2005)
- 225th ACS National Meeting, New Orleans, LA (March 2003):
 - Poster Presentation: Optimization of a HPLC Method for Analysis of Common OTC
 - Poster Presentation: Catawba College Keeps it Clean with the C4 Lab

References

- **Professor Hilka I. Kenttämaa**, Department of Chemistry, Purdue University, West Lafayette, IN
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- **Professor Mark S Sabo**, Head of Department of Chemistry, Catawba College, Salisbury, NC
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- **Dr. Penggao Duan**, Applications Scientist, Bruker Daltonics Inc., Billerica, MA
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