MATTHEW R. LINFORD

CURRICULUM VITAE

SUMMARY STATEMENT

Matthew Linford graduated with a B.S. in chemistry from Brigham Young University (BYU) in 1990 and received M.S. and Ph.D. degrees in materials science & engineering and chemistry, respectively, from Stanford University in 1996. While at Stanford he published the first two papers on monolayers on hydrogen-terminated silicon with his adviser Chris Chidsey. By Google Scholar these two papers have been cited more than 900 and 1400 times. After a post-doc at the Max Planck Institute of Colloids and Interfaces in Golm (previously Berlin), Germany with Helmut Möhwald studying polyelectrolyte multilayers, Linford worked in industry for three years – one year with Rohm and Haas in Pennsylvania and two years with two start-up companies (SEQ, renamed Praelux, a biotech company in New Jersey, and NanoTex in California). In 2000, he took a position as a faculty member at Brigham Young University and is now a full professor there. Linford has 506 publications, which include peer-reviewed papers, conference proceedings, book chapters, peer-reviewed contributions to Surface Science Spectra, commercial application notes, tutorial articles, and more than 40 patents. He was an editor for Applied Surface Science from 2015 - 2023, an Elsevier journal with an impact factor of ca. 7.4. He is a contributing editor for Vacuum Technology & Coating (VT&C) for which he writes a ca. monthly column on surface and material characterization. He has now written ca. 100 of these articles, which often focus on XPS, SE, and informatics methods. Linford was an associate editor for Surface Science Spectra (SSS) from 2003 – 2019, and was made a member of the editorial board of SSS in 2019. He is on the editorial board of Separations. In 2014 he became a fellow of the American Vacuum Society (AVS). In 2015 he was named an Alcuin Fellow at Brigham Young University (an award for excellence in teaching). By Google Scholar ('Matthew Linford', February, 2024 – note that these numbers can vary a little), he has more than 14,800 citations, his h-index is 53, and his i10-index is 210. His Erdös number is 4. While at BYU, Linford has studied thin film characterization with X-ray photoelectron spectroscopy (XPS) and spectroscopic ellipsometry (SE), statistical methods for data analysis, e.g., PCA and MCR, atomic layer deposition, diamond thin film/material growth, new materials for separations science (chromatography), new materials for long-term digital data storage, and the chemomechanical functionalization of silicon. His work in separations science led to the launch of the Flare chromatography column that was sold by Diamond Analytics. His work in data storage led him to co-found Millenniata (now Yours.co), which sells a DVD disc that lasts 1000 years and a Blu-ray disc that will last at least 300. His hobbies include tennis, piano/organ, and learning languages.

Positions

Brigham Young University (Provo, UT) *Assistant professor, associate professor, professor* (07/2000 - present)

NanoTex (Emeryville, CA) *Director of Research* 04/1999 – 07/2000

Praelux (Lawrenceville, NJ) *Senior Scientist* 07/1998 - 04/1999

Rohm and Haas (Bristol, PA) *Senior Scientist* 07/1997 - 06/1998

EDUCATION

Post Doc **Max Planck Institute for Colloid and Surface Science** (07/96 - 06/97)
Advisor: Helmuth Möhwald

Ph.D. **Stanford University**, *Chemistry* (09/1990 - 06/1996)
Advisor: Christopher E.D. Chidsey
Title of Thesis: "Chemical Functionalization of Hydrogen-Terminated Silicon Surfaces: The First Self-Assembled Monolayers on Silicon."

MS **Stanford University**, *Materials Science* (09/1990 - 06/1996)

BS **Brigham Young University**, *Chemistry* (Magna Cum Laude) (9/90)

Teaching

- Chemistry 106. Second-semester general chemistry. For years has taught this class and has often been the most popular instructor of it at BYU.
- Chemistry 105. First semester general chemistry.
- PS100. The general education class offered by his college that covers the basics of physics, chemistry, astronomy, and geology.
- University 292. This class was taught as a result of becoming an Alcuin fellow at the university. It was team-taught with a humanities (history) professor: Richard Kimball. Linford's part of the class was on mathematical thinking – models that have strongly influenced the world, e.g., exponential growth and decay, the logistic and modified logistic models, a model for catastrophe, the Lotka-Volterra model, a rabbit-sheep (competition between similar species) model, the SIR model for epidemics, chaos, the prisoners' dilemma, survivorship bias, etc.
- Chemistry 629R – graduate class in separation science (chromatography)
- Chemistry 729R – these are specialty graduate classes – has taught two of them on surface analysis, which focused on XPS and ellipsometry, and on chemometrics. He has also taught a graduate class entirely on spectroscopic ellipsometry and will teach a class in Fall, 2021 that is entirely dedicated to XPS.
- Chemistry 521 and 523. Advanced analytical chemistry and the accompanying instrumentation lab for seniors and first-year graduate students
- Chemistry 113. Freshman general chemistry laboratory course
- Chemistry 101 – the most basic general chemistry class offered at BYU

Editing

- Member of the Advisory Editorial Board of Hybrid Advances (an Elsevier journal) 1/2024 – present.
- Guest editor for a special issue of Surface & Coatings Technology in 2022 and 2023.
- Associate editor of Surface Science Spectra (SSS) from 1/2003 – 10/2019. SSS is a peer-reviewed journal from the American Vacuum Society dedicated to archiving surface data.
    - Spearheaded efforts at SSS to archive SE and low energy ion scattering (LEIS) data.

  - In 2019 became a member of the editorial board of the journal.
- Editorial Board Member of Separations since 8/2018, an online chromatography journal (http://www.mdpi.com/journal/separations)
- Editor of Applied Surface Science from 1/2015 – 7/2023. Handled more than 1600 manuscripts. Applied Surface Science is an Elsevier journal with an impact factor of 6.7. It is very well respected in the surface/materials community.

Awards

- Alcuin Fellow at Brigham Young University for "outstanding teacher-scholars whose work transcends the limits of their disciplines and who have made significant contributions to the general education and honors curriculums." (Aug. 24, 2015)
- Fellow of the American Vacuum Society (AVS) (Nov. 9, 2014)
- BYU Technology Transfer Award (Aug. 25, 2009)
- Schlossmann Postdoctoral Fellowship from the Max Planck Society (12/96 - 6/97)
- Hertz Fellowship. This is arguably the most prestigious fellowship given to graduate students of science and engineering in the U.S. (1991 - 1996) At the same time was also offered, but declined, NSF and DOD fellowships
- Ross Tucker Award given by the Electronics Division of the AIME ($2000 prize) (1995)
- Honored Student Award, Brigham Young University (1990)

Writing for a Trade Journal/Magazine

- Since Feb. 2014, Linford has authored ca. 100 articles in Vacuum Technology & Coating on surface and material characterization. According to the editor, 30,000 print copies of VT&C are sent out monthly, and each issue is read on line 15,000 – 25,000 times.

Invited Talks (since 2014)

- French Vacuum Society (July 6, 2023)
- Dept. seminar at UT Arlington (Arlington, TX, April 14, 2023)
- Microscopy & Microanalysis (Portland, OR, Aug. 2022)
- XPS Analysis Workshop (Le Croisic, France, 26 – 30 Sept. 2022)
- Corning Glass Summit (June 9, 2021).
- SVC Webinar 2.0 series (Dec.4, 2020). See https://www.youtube.com/watch?v=_7GIJlro2nM.
- ASTM E42 Surface Analysis Community Forum (Nov. 6, 2020)
- 8th International Symposium on Practical Surface Analysis (PSA-19) in Hokkaido, Japan (Nov. 2019)
- Los Alamos National Laboratories (Dec. 2018)
- AVS in Tampa, FL (Oct. 2017)
- HPTLC in Berlin, Germany (July 2017)
- ICASS in Dalian, China (June 2017)
- International Symposium on Surface Engineering based Convergence Science & Technology (SECST2015) in Changwon, Korea (Aug. 2015)
- 1st International Conference on Applied Surface Science (ICASS) in Shanghai, China (July 2015)

- Pittcon in New Orleans, LA (March, 2015)
- Quantitative Surface Analysis meeting (QSA15) in Baltimore, MD (Nov. 2014)
- Pittcon in Orlando, FL (March, 2014)
- Gave the inaugural 'Imagination Lecture Series' of Corning, Inc. at their R&D center in Sullivan Park, NY (July, 2014)
- HPTLC in Lyon, France (July 2014)

Undergraduate Mentoring

- Has mentored many undergraduates who have ended up as co-authors on his publications. Here are two examples:
  - George Major and Jacob Bagley recently worked as undergraduates in the Linford lab, each for multiple years. Major was a co-author on ten publications, and Bagley on seven. Major was admitted to graduate school in analytical chemistry at UCLA, later returning to BYU. Bagley was admitted to graduate school in physical chemistry at CalTech.

Companies Founded

NanoXCoatings and NanoXChromatography *co-Founder* (Salt Lake City, UT; Founded 2020)

- These companies have licensed technology from BYU and are trying to develop it.

Millenniata, Inc. *co-Founder* (American Fork, UT; Founded 7/07)

- Served on Millenniata's board from its inception in June 2007 until April 2010
- Millenniata awarded 2011 "Storage Vision" award for technology of the year
- Millenniata awarded "Most Innovative Product" on Dec. 10, 2009 by the Utah Valley Entrepreneurial Forum
- Millenniata won the "Best of State" award in the State of Utah in 2009 in "Science & Tech" in the category of "Computer Related Services"
- Millenniata was a finalist at the Utah Innovation Awards on April 30, 2009 in the category of Computer Hardward/Electrical Devices
- Millenniata won the "Best of State" award in the State of Utah in 2008 in "Science & Tech" in the category of "Computer and Software Providers"

Xeromax, Inc. *co-Founder.* (Provo, UT; 1/2009 – 09/2011)

- In 2009 Xeromax received "Outstanding Product" award at the Global Moot Corp competition – regarded as the "super bowl of university business plan competitions." at the University of Texas – Austin, in 2009 Xeromax received First Place BYU Business Plan Competition, and in 2009 Xeromax received Second Place at the Wake Forest Elevator Pitch Competition (national business plan completition)

LaserArray Technologies *co-Founder.* (Provo, UT; 2006 – 2011)

- Developed microlens laser patterning of surfaces to make bioarrays. (see *J. Am. Chem. Soc.* **2007**; *129(30)*; 9252-9253.)

Commercialized Inventions

- At BYU developed the inorganic write layer and carbon layers for a DVD that lasts for more than 1000 years. This product has been sold by Verbatim/Millenniata/yours.co.
- At BYU developed a nanodiamond-based high performance liquid chromatography column that was sold by Diamond Analytics.
- At BYU developed a hydrophobic coating that was licensed to Sonic Innovations and applied to many thousands of hearing aids.
- While working at NanoTex, developed the "Nano-Dry" product to make nylon and polyester hydrophilic. This product increases the comfort of fabrics and clothing, and was marketed throughout the United States. Tiger Woods is shown in the October, 2003 issue of Golf Digest wearing a pair of pants that have this finish on them – Nano-Dry had become part of the Nike golf collection.

Consulting

HealthTell (Chandler, AZ**;** 12/13 – 7/16)
- Surface modification of silicon oxide with silanes for peptide array growth

P2i, Inc. (Abingdon, UK; 8/11 – 2/13)
- Pulsed plasma polymerization of hydrophobic monomers to coat electronic devices

NanoTex, LLC. (Emeryville, CA; Consulted intermittently between 8/00 and 2/06)
- Development of fabric finishes

Praelux, Inc. (Princeton / Lawrenceville, NJ; (11/97 - 2/98)
- Surface modification for nucleotide capture

Work Experience

NanoTex, LLC. *Director of Research.* Emeryville, CA. 4/99 – 7/00
- Developed the "Nano-Dry" product to make nylon and polyester hydrophilic. This product increases the comfort of fabrics and clothing, e.g., Tiger Woods is shown in the October, 2003 issue of Golf Digest wearing a pair of pants that have this finish on them – Nano-Dry had become part of the Nike golf collection.
- Inventor on 10+ patents from work with Nano-Tex
- Designed and synthesized numerous polymers (mostly by free radical polymerizations of acrylates and methacrylates)
- Formulated with polymers, surfactants, wetting agents, defoaming agents, etc.

Praelux, Inc. *Senior Scientist*. Princeton / Lawrenceville, NJ. 7/98 - 4/99
- Developed methods to immobilize single nucleotides and DNA oligomers onto surfaces
- Developed procedures to attach a nickel (NTA) chelator to glass cover slips to bind proteins with 6-his tags
- Developed novel methods to immobilize amines onto surfaces

Rohm and Haas Co. (now Dow) *Senior Scientist.* Bristol, PA. 7/97 - 6/98

- Developed an IR tool to do rapid screening of catalysts
- Designed and built a laser scanner for detecting defects on plastic sheet for flat panel liquid crystal displays
- Analyzed polymers, surfaces, and catalysts using IR microscopy, e.g., ATR and DRIFT

Ulvac, Japan. *Summer Intern.* (Tsukuba, Japan; Summer 1995)
- Created new pyro- and piezoelectric materials using vacuum vapor deposition of monomers followed by poling and curing of the polymer films (Linford, et al. *Jpn. J. Appl. Phys. Part 1* **1996**, *35*(*2A*), 677-678)

AT&T Bell Labs. *Summer Intern.* (Murray Hill, NJ; Summer 1992)
- Studied electron transfer across organic monolayers on gold (Smalley, et al. *J. Phys. Chem.* **1995**, *99*, 13141-13149)

Huels, A.G. *Summer Intern.* (Marl, Germany; Summer 1988)
- Analyzed company products by gas chromatography
- Worked on a method to extract, concentrate, and analyze dioctylphthalate from water

Brigham Young University. *Undergraduate Research.* (Provo, UT; 1988 - 1990)
- Researched supercritical fluid chromatography coupled to supersonic jet spectroscopy (Goates, et al. Anal. Chem. 1992, 64, 2, 233-238.)

Missionary for The Church of Jesus Christ of Latter-day Saints. (Montevideo, Uruguay; 1985 - 1987)
- Worked with members and taught investigators about the church
- Lived and worked throughout Uruguay and also for a few months in Brazil

LANGUAGE SKILLS

- Spanish (advanced), German (intermediate to advanced), French, Hebrew, and Yiddish (beginning), basic ability to read Portuguese and Italian.

2024 Publications

PEER-REVIEWED PAPERS

1. Behnam Moeini, John M. Linford, Neal Gallagher, Matthew R. Linford "Surface Analysis Insight Note. An Example of a Cluster Analysis (CA) of Spectra from an X-ray Photoelectron Spectroscopy Image." *Surface and Interface Analysis* **2024**, *56(2)*, 73 – 81. http://doi.org/10.1002/sia.7270.
2. Joshua W. Pinder, George H. Major, Don Baer, Jeff Terry, James E. Whitten, Jan Čechal, Jacob D. Crossman, Alvaro J. Lizarbe, Samira Jafari, Christopher D. Easton, Jonas Baltrusaitis, Mattijs van Sprosen, Matthew R. Linford. "Avoiding Common Errors in X-ray Photoelectron Spectroscopy Data Collection and Analysis, and Properly Reporting Instrument Parameters" *Applied Surface Science Advances* **2024**, *19*, 100534.
3. Samira Jafari, Gregory Snow, Jeff Terry, Matthew R. Linford. "New Method for Collecting XPS and Other Spectra: A Thought (Gedanken) Experiment" *Hybrid Advances* **2024**, *5*, 100157.
4. Stanislav Průša, Matthew R. Linford, Elena Vaníčková, Pavel Bábík, Joshua W. Pinder, Tomáš Šikola, Hidde H. Brongersma "A practical guide to interpreting low energy ion scattering (LEIS) spectra" *Applied Surface Science*. **2024**, *657*, 158793. *https://doi.org/10.1016/j.apsusc.2023.158793*.
5. Alberto Herrera-Gomez, David J.H. Cant, Thierry Conard, Olivier Renault, Mattheu R. Linford, Joshua W. Pinder, Jeff Fenton, Donald Baer. "New Challenges Associated with HAXPES (Report on the 2023 ASTM E42-ASSD AVS Workshop)" Accepted Surface and Interface Analysis.
6. Samira Jafari, Blain Johs, Matthew R. Linford "Immersion ellipsometry of ultrathin films breaks the correlation between index of refraction and film thickness. The theory and practice of the technique and two examples of it." Accepted JVSTA.
7. Joshua W Pinder, Jacob Crossman, Braxton Kulbacki, Matthew R Linford "Introduction to the Special Collection for the Society of Vacuum Coaters' 66th Annual Technical Conference." Accepted Surface & Coatings Technology. (Note that this paper was reviewed by editors at Elsevier, but not sent out for traditional review.) https://www-sciencedirect-com.byu.idm.oclc.org/science/article/pii/S0257897224008909

ARTICLES IN TECHNOLOGY/TRADE MAGAZINES

8. James N. Hilfiker, Tom Tiwald, and Matthew R. Linford "Analysis of Transparent Thin Films with Infrared Spectroscopic Ellipsometry. Fitting the Refractive Index with the Sellmeier Dispersion Model." *Vacuum Technology & Coating, January, 2024.*
9. Long Van Le, Young Dong Kim, David E. Aspnes, Matthew R. Linford "Advanced Approaches to Noise Reduction in Spectra." *Vacuum Technology & Coating, February, 2024.*
10. Alvaro J. Lizarbe, Kristopher S. Wright, Samira Jafari, Long Van Le, Young Dong Kim, David E. Aspnes, Matthew R. Linford "Advanced Approaches to Noise Reduction in Spectra, Part 2." *Vacuum Technology & Coating, March, 2024.*

11. Samira Jafari, Jeff Terry, Greg Snow, Matthew R. Linford "Taking Flat, Featureless Spectra. A New Way to Take XPS Data and other Spectra." *Vacuum Technology & Coating, April, 2024.*
12. Alvaro J. Lizarbe, Kristopher S. Wright, David E. Aspnes, Matthew R. Linford "Fun with Fourier transforms. Some preliminaries, and definitions and manipulations of some useful functions." *Vacuum Technology & Coating, May, 2024.*
13. Alvaro J. Lizarbe, Kristopher S. Wright, Daniel E. Austin, David E. Aspnes, Matthew R. Linford "A Few Words by Conrad Boss on Continuing Education, and an Introduction to the Hilbert Transform." *Vacuum Technology & Coating, June, 2024.*
14. Alvaro J. Lizarbe, Garrett Lewis, Gavin Murray, Kristopher S. Wright, Daniel E. Austin, David E. Aspnes, Matthew R. Linford "Introduction to the Hilbert Transform. Part 2 – How the Hilbert Transform can Remove the Redundant, Negative Frequencies from Functions." *Vacuum Technology & Coating, June, 2025.*

PEER-REVIEWED CONTRIBUTIONS TO SPECTRAL DATABASES

15. Analysis of silver metal with a Thermo Scientific K-Alpha XPS instrument at 50 and 200 eV pass energies. Accepted *Surface Science Spectra.*

2023 Publications

PEER-REVIEWED PAPERS

16. Tahereh G. Avval, Stanislav Průša, Cody V. Cushman, Grant T. Hodges, Sarah Fearn, Seong Kim, Jan Čechal, Elena Vaníčková, Pavel Bábík, Tomáš Šikola, Hidde H. Brongersma, and Matthew R. Linford. "A Tag-and-Count Approach for Quantifying Surface Silanol Densities on Fused Silica Based on Atomic Layer Deposition and High-Sensitivity Low-Energy Ion Scattering." *Applied Surface Science* **2023**, *607*, 154551.
17. George H. Major, Joshua Pinder, Daniel E. Austin, Donald R. Baer, Steven L. Castle, Jan Čehal, B. Maxwell Clark, Hagai Cohen, Jonathan Counsell, Alberto Herrera-Gomez, Seong H. Kim, David J. Morgan, Robert L. Opila, Cedric J. Powell, Stanislav Průša, Adam Roberts, Mario Rocca, Naoto Shirahata, Tomáš Šikola, Emily F. Smith, Regina C. So, Jennifer Strunk, Andrew Teplyakov, Jeff Terry, Stephen G. Weber, Matthew R. Linford. "Perspective on improving the quality of surface and material data analysis in the scientific literature with a focus on X-ray Photoelectron Spectroscopy (XPS)." *Journal of Vacuum Science & Technology A* **2023**, *41*, 038501. https://doi.org/10.1116/6.0002437.
18. George H. Major, B. Maxwell Clark, Kevin Cayabyab, Nathan Engel, Christopher D. Easton, Jan Čechal, Donald R. Baer, Jeff Terry, Matthew R. Linford. "Insufficient Reporting of X-ray Photoelectron Spectroscopy Instrumental and Peak Fitting Parameters (Metadata) in the Scientific Literature." *Journal of Vacuum Science & Technology A* **2023**, *41*, 043201. https://doi.org/10.1116/6.0002714.
19. Behnam Moeini, Matthew R. Linford. "Surface Analysis Insight Note: Initial, Statistical Evaluation of X-ray Photoelectron Spectroscopy Images." *Surface and Interface Analysis* **2023**, *55(8)*, 572 - 578. http://doi.org/10.1002/sia.7218.

20. Behnam Moeini, Matthew R. Linford. "Surface Analysis Insight Note: Analysis of X-ray Photoelectron Spectroscopy Images with Summary Statistics." Surface and Interface Analysis. *Surface and Interface Analysis* **2023**, *55(11)*, 789 - 797. http://doi.org/10.1002/sia.7248.
21. Alvaro J. Lizarbe, George H. Major, Vincent Fernandez, Neal Fairley, and Matthew R. Linford. "Insight Note: X-ray Photoelectron Spectroscopy (XPS) Peak Fitting of the Al 2p Peak from Electrically Isolated Aluminum Foil with an Oxide Layer." *Surface and Interface Analysis* **2023**, *55(9)*, 651 - 657. http://dx.doi.org/10.1002/sia.7238.
22. Behnam Moeini, Tahereh Avval, Hidde Brongersma, Stanislav Průša, Pavel Bábík, Elena Vaníčková, Brian R Strohmeier, David S Bell, Dennis Eggett, Steven M George, Matthew R Linford. "Area-Selective (Inhibited) Atomic Layer Deposition of ZnO on Si/SiO_2 Using Tris(trimethylamino)methylsilane." Preprint. 2023-05-26. DOI: 10.20944/preprints202305.2043.v1.
23. Behnam Moeini, Tahereh G. Avval, Neal Gallagher, Matthew R. Linford. "Surface Analysis Insight Note. Principal Component Analysis (PCA) of an X-ray Photoelectron Spectroscopy Image. The Importance of Preprocessing." *Surface and Interface Analysis* **2023**, *55(11)*, 798 - 807. https://doi.org/10.1002/sia.7252.
24. Behnam Moeini, Joshua W. Pinder, Tahereh G. Avval, Collin Jacobsen, Hidde H. Brongersma, Stanislav Prusa, Pavel Bábík, Elena Vaníčková, Morris D. Argyle, Brian R. Strohmeier, Brian Jones, Daniel Shollenberger, David S. Bell, Matthew R. Linford. "Controlling the Surface Silanol Density in Capillary Columns and Planar Silicon via the Self-Limiting, Gas-Phase Deposition of Tris(dimethylamino)methylsilane, and Quantification of Surface Silanols after Silanization by Low Energy Ion Scattering." Accepted J. Chrom. A.
25. Behnam Moeini, David T. Fullwood, Paul Minson, Daniel Shollenberger, David S. Bell, Morris D. Argyle, Richard Vanfleet, Matthew R. Linford "Microstructure quantification of oblique angle sputtered porous a-Si thin films as a basis for structure-property relations of solid phase microextraction coatings" Accepted Surface & Coatings Technology.
26. Behnam Moeini, Neal Gallagher, Matthew R. Linford "Surface Analysis Insight Note. Multivariate Curve Resolution (MCR) of an X-ray Photoelectron Spectroscopy Image." Accepted Surface and Interface Analysis. http://doi.org/10.1002/sia.7260.

BOOK CHAPTER

27. George H. Major, Neal Fairley, Vincent Fernandez, Matthew R. Linford 'Introduction to Chemical State Analysis by XPS with Examples' in "APPLICATIONS OF X-RAY PHOTOELECTRON SPECTROSCOPY TO CATALYTIC STUDIES" edited by Spiros Zafeiratos and published by **World Scientific** as part of the *Catalytic Science* book series.

ARTICLES IN TECHNOLOGY/TRADE MAGAZINES

28. Mireille Richard-Plouet, Vincent Fernandez, David Morgan, Solène Béchu, Mark C. Biesinger, Neal Fairley, Delphine Flahaut, Aurélie Girard, Shaoliang Guan, Jonathan Hamon, Mark Isaacs, George H. Major, Emily Smith, Matthew R. Linford. "Recent Workshops on X-

ray Photoelectron Spectroscopy (XPS) in Roscoff and Le Croisic, France, and an Upcoming XPS Workshop in South Wales, UK." *Vacuum Technology & Coating, January, 2023.*

29. Jeremy Vanderslice, James N. Hilfiker, Joshua W. Pinder, and Matthew R. Linford. "Characterization of Porous Thin Films using Ellipsometric Porosimetry, Part 1." *Vacuum Technology & Coating, February, 2023.*
30. Jeremy Vanderslice, James N. Hilfiker, Joshua W. Pinder, and Matthew R. Linford. "Characterization of Porous Thin Films using Ellipsometric Porosimetry, Part 2." *Vacuum Technology & Coating, March, 2023.*
31. Alvaro J. Lizarbe, Juliana (Julie) Boerio-Goates, Matthew R. Linford. "Using Potential Energy Diagrams to Understand why Real Gases become Increasingly Ideal at Higher Temperatures." *Vacuum Technology & Coating, April, 2023.*
32. Jacob D. Crossman, Joshua W. Pinder, Chandler D. Boss, Matthew R. Linford. "Development and Use of a 3D Printed Alignment Jig for Repositioning Samples in Spectroscopic Ellipsometry." *Vacuum Technology & Coating, May, 2023.*
33. Pavel Komarov, Radek Dao, Vojtěch Schánilec, Veronika Hegrová, Ondřej Novotny, Michal Pavera, Jan Neuman, Matthew R. Linford. "The AFM-in-SEM technique: True correlative sample analysis with the LiteScope." *Vacuum Technology & Coating, June, 2023.*
34. Alvaro Lizarbe, David J. Morgan, Matthew R. Linford. "A Brief Discussion of Sample Damage in X-ray Photoelectron Spectroscopy (XPS) with Recommendations for Identifying and Mitigating It." *Vacuum Technology & Coating, July, 2023.*
35. Samira Jafari, Joshua W. Pinder, Matthew R. Linford. "Preprocessing of X-ray Photoelectron Spectroscopy (XPS) Data for Chemometrics/Machine Learning. Why Autoscaling is Usually a Poor Choice Compared to Mean Centering." *Vacuum Technology & Coating, August, 2023.*
36. Samira Jafari, Joshua W. Pinder, Alvaro Lizarbe, John M. Linford, Matthew R. Linford "In the Multi-Instrument Characterization of Surfaces and Materials Use Orthogonal Instruments and Data Science Tools. An Analogy to Tiebreakers in Tennis and Soccer." *Vacuum Technology & Coating, September, 2023.*
37. Jeremy Van Derslice, James Hilfiker, Joshua W. Pinder, Matthew R. Linford "In Situ Spectroscopic Ellipsometry Applications to Atomic Layer Deposition." J.A. Woollam Annual Newsletter, *2023*. (Article originally published in VTC Magazine; Part 2, November 2022.
38. Joshua W. Pinder, Jacob D. Crossman, Matthew R. Linford "Introducing the Savitzky-Golay (SG) Smooth Using Basic Matrix Algebra, Including Generating SG Kernels. Part 1." *Vacuum Technology & Coating, October, 2023.*
39. Jacob D. Crossman, Joshua W. Pinder, Matthew R. Linford "Introducing the Savitzky-Golay (SG) Smooth Using Basic Matrix Algebra, Including Generating SG Kernels. Part 2." *Vacuum Technology & Coating, November, 2023.*
40. James N. Hilfiker, Tom Tiwald, and Matthew R. Linford "Differences Between Standard and Infrared Spectroscopic Ellipsometry (SE)." *Vacuum Technology & Coating, December, 2023.*

PATENTS

41. Anubhav Diwan, Matt Linford U.S. Patent No. 11,822,182 B2. 'Wire Grid Polarizer with Mult-Layer Silane Conformal Coating'. Nov. 21, 2023.
42. Matthew R. Linford, Brian Johnson, Anubhav Diwan U.S. Patent No. 11,746,418 B2. 'Chemical Vapor Deposition of Thick Inorganic Coating on a Polarizer'. Sept. 5, 2023.

PEER-REVIEWED CONTRIBUTIONS TO SPECTRAL DATABASES

43. Annika Dean, Samira Jafari, Matthew R. Linford "Analysis of Copper Metal with a K-Alpha Instrument from Thermo Scientific by X-ray Photoelectron Spectroscopy (XPS) at 60 and 200 eV Pass Energy." *Surface Science Spectra* **2023**, *30*, 000000. doi: 10.1116/6.0002958

2022 Publications

PEER-REVIEWED PAPERS

44. Patel, Dhananjay; Major, George; Jacobsen, Collin; Shah, Dhruv; Strohmeier, Brian; Shollenberger, Daniel; Bell, David; Argyle, Morris; Linford, Matthew. "Flow Through Atmospheric Pressure – Atomic Layer Deposition (AP-ALD) Reactor for Thin Film Deposition in Capillary Columns." *Anal. Chem.* **2022**, *94,* 7483–7491. DOI: 10.1021/acs.analchem.1c05029.
45. George H. Major, Neal Fairley, Peter M.A. Sherwood, Matthew R. Linford, Jeff Terry, Vincent Fernandez, Kateryna Artyushkova. "Erratum: "Practical guide for curve fitting in X-ray photoelectron spectroscopy" [J. Vac. Sci. Technol. A **38**, 061203 (2020)]" *J. Vac. Sci. Technol. A* **2022**, *40,* 057001, doi.org/10.1116/6.0002004.
46. George H. Major, Vincent Fernandez, Neal Fairley, Emily F. Smith, Matthew R. Linford "Guide to XPS Data Analysis: Applying Appropriate Constraints to Synthetic Peaks in XPS Peak Fitting" J. Vac. Sci. Technol. A 40, 000000 (**2022**); doi: 10.1116/6.0001975.
47. Tahereh G. Avval, Neal Gallagher, David Morgan, Pascal Bargiela, Neal Fairley, Vincent Fernandez, Matthew R. Linford. "Practical Guide on Chemometrics/Informatics in X-ray Photoelectron Spectroscopy (XPS), Part 1: Introduction to Methods Useful for Large or Complex Data Sets." *J. Vac. Sci. Technol. A* **2022**, *40(6).* DOI.org/10.1116/6.0002082.
48. Tahereh G. Avval, Hyrum Haack, Neal Gallagher, David Morgan, Pascal Bargiela, Neal Fairley, Vincent Fernandez, Matthew R. Linford. "Practical Guide on Chemometrics/Informatics in X-ray Photoelectron Spectroscopy (XPS), Part 2: Example Applications of Multiple Methods to the Degradation of Cellulose and Tartaric Acid." *J. Vac. Sci. Technol. A* **2022**, *40(6).* DOI: 10.1116/6.0001969.
49. George H. Major, Vincent Fernandez, Neal Fairley, Matthew R. Linford "A Detailed View of the Gaussian-Lorentzian Sum and Product Functions, and their Comparison to the Voigt Function" *Surf. Interface Anal.* **2022**, *54*, 262 – 269, doi:10.1002/sia.7050.

ARTICLES IN VT&C MAGAZINE

50. James N. Hilfiker and Matthew R. Linford. "Fitting the Spectroscopic Ellipsometry Data from a Rather Thick (Organic?) Film on Fused Silica. Part 3 – Determining the Optical Constants at all Wavelengths Using a B-spline." *Vacuum Technology & Coating, January, 2022.*
51. George H. Major, Neal Fairley, Vincent Fernandez, Matthew R. Linford "Chemical State Analysis in XPS: A Case Study. Selecting the Right Baseline to Obtain the Correct Cl 2s to Cl 2p Area Ratio from a Sample of NaCl." *Vacuum Technology & Coating, February, 2022.*

52. George H. Major, Neal Fairley, Vincent Fernandez, Matthew R. Linford "How to Measure the Size of the X-ray Beam/Spot in XPS (and in Other Techniques)." *Vacuum Technology & Coating, March, 2022.*
53. Stanislav Průša, Pavel Bábík, Elena Vaníčková, George H. Major, Matthew R. Linford "Practical Considerations for Performing Low Energy Ion Scattering." *Vacuum Technology & Coating, April, 2022.*
54. Joshua Pinder, Mark Engelhard, Don Baer, Paul Dietrich, Andreas Thissen, Matthew R. Linford "Correct and Incorrect Terminology, and Confused Words and Terms, in Surface Analysis." *Vacuum Technology & Coating, May, 2022.*
55. Jonathan Counsell, Adam Roberts, Matthew R. Linford "Automation of Measurements with Modern X-ray Photoelectron Spectrometers." *Vacuum Technology & Coating, June, 2022.*
56. James N. Hilfiker and Matthew R. Linford. "Using Artifact Minimization to Model Thin Metallic Films in Spectroscopic Ellipsometry." *Vacuum Technology & Coating, July, 2022.*
57. James N. Hilfiker and Matthew R. Linford. "Using Interference Enhancement to Increase the Information Content of Spectroscopic Ellipsometry Measurements." *Vacuum Technology & Coating, August, 2022.*
58. James N. Hilfiker and Matthew R. Linford. "Combining Spectroscopic Ellipsometry and Transmission Spectrophotometric Data for the Analysis of Thin Metal Films." *Vacuum Technology & Coating, September, 2022.*
59. James N. Hilfiker, Jeremy Vanderslice, Matthew R. Linford. "In Situ Spectroscopic Ellipsometry, Part 1. Introduction." *Vacuum Technology & Coating, October, 2022.*
60. Jeremy Van Derslice, James N. Hilfiker, Joshua W. Pinder, Matthew R. Linford. "In Situ Spectroscopic Ellipsometry, Part 2. Applications to Atomic Layer Deposition." *Vacuum Technology & Coating, November, 2022.*
61. George H. Major, David Morgan, Matthew R. Linford. "The Sputter Reduction of Metal Oxides. Some Basic Thermodynamic Arguments for why this Takes Place." *Vacuum Technology & Coating, December, 2022.*

EXTENDED ABSTRACT

62. Tahereh G. Avval, George H. Major, Matthew R. Linford "The Reproducibility Crisis, a Comprehensive Set of Guides on XPS, and Better Data Fitting/Chemometrics of XPS Data." Microscopy & Microanalysis 2022. Portland, OR.

PATENTS

63. Stew Nielson, Matt Linford, Anubhav Diwan, Matthew C. George U.S. Patent No. 11,513,272 B2. 'Wire grid polarizer with silane protective coating'. Nov. 29, 2022.

2021 Publications

PEER-REVIEWED PAPERS

64. Thomas R. Gengenbach, George H. Major, Matthew R. Linford, Christopher D Easton 'Practical Guides for X-ray Photoelectron Spectroscopy (XPS): Interpreting the Carbon 1s Spectrum' *J. Vac. Sci. Technol. A,* **2021**, *39*, 013204.
65. George H. Major, Tahereh G. Avval, Dhananjay I. Patel, Dhruv Shah, Tuhin Roychowdhury, Anders J. Barlow, Paul J. Pigram, Mark Greiner, Vincent Fernandez, Alberto Herrera-Gomez, Matthew R. Linford. A Discussion of Approaches for Fitting Asymmetric Signals in X-ray Photoelectron Spectroscopy (XPS), Noting the Importance of Voigt-like Peak Shapes. *Surf. Interface Anal.* **2021**, *53,* 689–707. https://doi.org/10.1002/sia.6958.
66. Patel DI, Roychowdhury T, Shah D, Jacobsen C, Herrington JS, Hoisington J, Myers C, Salazar BG, Walker AV, Bell DS, Linford MR. '6-Phenylhexyl silane derivatized, sputtered silicon solid phase microextraction fiber for the parts-per-trillion detection of polyaromatic hydrocarbons in water and baby formula.' *J. Sep. Science* **2021**, 1 – 13. https://doi.org/10.1002/jssc.202100266.
67. Behnam Moeini, Hyrum Haack, Neal Fairley, Vincent Fernandez, Thomas R. Gengenbach, Christopher D Easton, and Matthew R. Linford. 'Box Plots: A Simple Graphical Tool for Visualizing Overfitting in Peak Fitting as Demonstrated with X-ray Photoelectron Spectroscopy Data.' *J. Electr. Spect. Rel. Phenom*. **2021**, *250*, 147094.
68. Brian I. Johnson, Tahereh G. Avval, R. Steven Turley, Matthew R. Linford, David D. Allred 'Oxidation of aluminum thin films protected by ultrathin MgF_2 layers measured using spectroscopic ellipsometry and X-ray photoelectron spectroscopy'. *OSA Continuum*, **2021**, *4(3)*, 879 – 895.
69. Donald R. Baer, Kateryna Artyushkova, Christopher. R. Brundle, James E. Castle, Mark H. Engelhard, Karen J. Gaskell, John. T. Grant, Richard T. Haasch, Matthew R. Linford, Cedric. J. Powell, Peter M. A. Sherwood, Vincent. S. Smentkowski 'Erratum: "Practical guides for x-ray photoelectron spectroscopy: First steps in planning, conducting, and reporting XPS measurements" [J. Vac. Sci. 4 Technol. A 37, 031401 (2019)]'. J. Vac. Sci. Technol. A 39, 000000 (2021); doi: 10.1116/6.0000822.
70. Behnam Moeini, Tahereh G. Avval, Matthew R. Linford, Masoumeh Ghalkhani, Massoud Kaykhaii, Rasol Abdullah Mirzaie. 'Surface-Orientated Platinum Nanoparticles Electrodeposited on Carbon Substrate as a High Performance Electrocatalyst for Glucose Oxidation Reaction in Alkaline Media.' *Materials Science & Engineering B*, **2021**, *268*, 115147.
71. Massoud Kaykhaii and Matthew R. Linford 'Characterization of polymeric materials and their degradation products' *Intl. Journal of New Chemistry*, **2021**, *8(1)*, 1 – 15. DOI: 10.22034/IJNC.2020.139035.1135.
72. Behnam Moeini, Tahereh G. Avval, Masoumeh Ghalkhani Matthew R. Linford, Rasol Abdullah Mirzaie. **'**A Nickel Sublayer: An Improvement in the Electrochemical Performance of Platinum-Based Electrocatalysts as Anode in Glucose Alkaline Fuel Cells'. *Iranian Journal of Catalysis*, **2021**, *11(1)*, 77 – 87.
73. Avval, Tahereh; Moeini, Behnam; Carver, Victoria; Fairley, Neal; Smith, Emily; Baltrusaitis, Jonas; Fernandez, Vincent; Tyler, Bonnie; Gallagher, Neal; Linford, Matthew 'The Often-Overlooked Power of Summary Statistics in Exploratory Data Analysis. Comparison of Pattern Recognition Entropy (PRE) to other Summary Statistics and Introduction of Divided-Spectrum-PRE (DS-PRE).' *J. Chem. Inf. Model.* **2021**, *61*, 4173−4189. 10.1021/acs.jcim.1c00244.

74. Moeini, B; Linford, M.R.; Fairley, N.; Barlow, A.; Cumpson, P.; Morgan, D.; Fernandez, V.; Baltrusaitis, J. "Definition of a New (Doniach-Sunjic-Shirley) Peak Shape for Fitting Asymmetric Signals Applied to Reduced Graphene Oxide/Graphene Oxide XPS Spectra" Surface and Interface Analysis. *Surf Interface Anal.* **2022**, *54,* 67–77. http://dx.doi.org/10.1002/sia.7021.
75. Akin, B.; Linford, M.R.; Ahmadivand, A.; Altindal, S. 'All-dielectric Fabry-Perot Cavity Design for Spectrally Selective Mid-Infrared Absorption' *Phys. Status Solidi B* **2021**, 2100464. https://doi.org/10.1002/pssb.202100464.
76. Dhananjay I. Patel, Tuhin Roychowdhury, Collin Jacobsen, Colton Myers, Jason S. Herrington and Matthew R. Linford "Evaluation of New, Sputtered Carbon SPME Fibers with a Multi-Functional Group Test Mixture" *Separations* **2021**, *8*, 228. https://doi.org/10.3390/separations8120228.

ARTICLES IN VT&C MAGAZINE

77. George H. Major, Tahereh G. Avval, Behnam Moeini, William Skinner, Thomas R. Gengenbach, Christopher D. Easton, Alberto Herrera-Gomez, Tim S. Nunney, Donald R. Baer, Matthew R. Linford. Towards Better Surface and Material Characterization – Understanding the Frequency and Nature of Errors in XPS Data Analysis in the Scientific Literature. *Vacuum Technology & Coating, January, 2021.*
78. George Major, Vincent Fernandez, Neal Fairley, Matthew R. Linford. How Convolution and the Fourier Transform Affect Data Acquisition and Analysis in Material Characterization, and Why XPS Peak Fitting Should Not Be Called 'Deconvolution' *Vacuum Technology & Coating, February, 2021.*
79. Dhruv Shah, Dhananjay I. Patel, Tuhin Roychowdhury, Brian I. Johnson, Matthew R. Linford 'A Case Study in Surface and Material Characterization: Substrate Protection and Deprotection with Evaporated Salt Films to Prevent Surface Contamination, Enable Selective Atomic Layer Deposition, and Protect Biosensors' *Vacuum Technology & Coating, March, 2021.*
80. George H. Major, Neal Fairley, Vincent Fernandez, Matthew R. Linford 'An Algorithm for Determining the Full Width at Half Maximum (FWHM) Value of a Synthetic Peak/Function' *Vacuum Technology & Coating, May, 2021.*
81. George H. Major, Emily Smith, Neal Fairley, Matthew R. Linford 'X-ray Photoelectron Spectroscopy of Germanium with a Native Oxide Layer (Ge/GeO_2): Multiple Chemical States, Spin-Orbit Peaks, Attenuation Lengths, and Overlapping Peaks' *Vacuum Technology & Coating, June, 2021.*
82. Dhananjay I. Patel, James N. Hilfiker, Matthew R. Linford 'Using Spectroscopic Ellipsometry to Quickly Determine Whether a Substrate is Coated or Bare' *Vacuum Technology & Coating, July, 2021.*
83. Dhananjay I. Patel, James N. Hilfiker, Matthew R. Linford 'Fitting the Spectroscopic Ellipsometry Psi-Delta Data from a ca. 25 nm Film of SiO_2 on Si' *Vacuum Technology & Coating, August, 2021.*
84. Nick Keller, Andy Antonelli, Matthew R. Linford 'Optical Critical Dimension Metrology for Semiconductor Manufacturing' *Vacuum Technology & Coating, September, 2021.*
85. George H. Major and Matthew R. Linford 'Sixteen Questions (and Answers) about X-ray Photoelectron Spectroscopy and Related Topics' *Vacuum Technology & Coating, October, 2021.*

86. Dhananjay I. Patel, Collin Jacobsen, James N. Hilfiker, Matthew R. Linford 'Fitting the Spectroscopic Ellipsometry Data from a Rather Thick (Organic?) Film on Fused Silica. Part 1. Using the 'Global Fit'.' *Vacuum Technology & Coating, November, 2021.*
87. James N. Hilfiker, Matthew R. Linford 'Fitting the Spectroscopic Ellipsometry Data from a Rather Thick (Organic?) Film on Fused Silica. Part 2. Challenges from Bandwidth, Thickness Non-Uniformity, Absorption, and Roughness.' *Vacuum Technology & Coating, December, 2021.*

PEER-REVIEWED CONTRIBUTIONS TO SPECTRAL DATABASES

88. Tahereh G. Avval, Sean C. Chapman, Victoria Carver, Paul Dietrich, Andreas Thißen, Matthew R. Linford. 'Cuttlefish Bone (Cuttlebone), by Near-Ambient Pressure XPS'. *Surface Science Spectra* **2021**, *28*, 014002. DOI: 10.1116/6.0000811.
89. Tahereh G. Avva1, Stanislav Průša, Sean C. Chapman, Matthew R. Linford, Tomáš Šikola, Hidde H. Brongersma. 'Zinc and copper, by high-sensitivity - low energy ion scattering. *Surface Science Spectra* **2021**, *28*, 014201. DOI: 10.1116/6.0000953.

PATENTS

90. Linford; Matthew R., Diwan; Anubhav, Singh; Bhupinder U.S. 'Solid phase coatings for microextraction' Patent No. 10,969,307. April 6, 2021.

2020 Publications

PEER-REVIEWED PAPERS

91. Matthew R. Linford, Vincent S. Smentkowski, John T. Grant, C. Richard Brundle, Peter M.A. Sherwood, Mark C. Biesinger, Jeff Terry, Kateryna Artyushkova, Alberto Herrera-Gómez, Sven Tougaard, William Skinner, Jean-Jacques Pireaux, Christopher F. McConville, Christopher D. Easton, Thomas R. Gengenbach, George H. Major, Paul Dietrich, Andreas Thissen, Mark Engelhard, Cedric J. Powell, Karen J. Gaskell and Donald R. Baer. "Proliferation of Faulty Materials Data Analysis in the Literature." *Microscopy and Microanalysis* **2020**, *26(1), 1–2*, doi:10.1017/S1431927619015332.
92. George H. Major, Shiladitya Chatterjee, Matthew R. Linford. "Resolving a Mathematical Inconsistency in the Ho and McKay Adsorption Equation." *Applied Surface Science* **2020**, *504*, 144157.
93. Brian I. Johnson, Tahereh G. Avval, Joshua John Wheeler, Hans C. Anderson, Anubhav Diwan, Kara J. Stowers, Daniel H. Ess, Matthew R. Linford. "Semiempirical Peak Fitting Guided by ab Initio Calculations of X-ray Photoelectron Spectroscopy Narrow Scans of Chemisorbed, Fluorinated Silanes." *Langmuir* **2020**, *36(8)*, 1878 – 1886. DOI: 10.1021/acs.langmuir.9b03136.
94. Tuhin Roychowdhury, Dhruv Shah, Varun Jain, Dhananjay I. Patel, Berg Dodson, William Skinner, James N. Hilfiker, Stacey J. Smith, Matthew R. Linford. "Multi-instrument

characterization of HiPIMS and DC magnetron sputtered tungsten and copper films." *Surface and Interface Analysis*. https://doi.org/10.1002/sia.6753.

95. Leo Lebanov, Shiladitya Chatterjee, Laura Tedone, Sean C. Chapman, Matthew R. Linford, Brett Paull. "Comprehensive characterisation of ylang-ylang essential oils according to distillation time, origin, and chemical composition using a multivariate approach applied to average mass spectra and segmented average mass spectral data." *Accepted Journal of Chromatography A*.
96. Tuhin Roychowdhury; Dhananjay I Patel; Dhruv Shah; Anubhav Diwan; Massoud Kaykhaii; Jason S Herrington; David S Bell; Matthew Linford "Sputtered Silicon Solid Phase Microextraction Fibers with a Polydimethylsiloxane Stationary Phase with Negligible Carry-Over and Phase Bleed." *Journal of Chromatography A* **2020**, *1623*, 461065.
97. Dhruv Shah, Dhananjay I. Patel, Tuhin Roychowdhury, Brian I. Johnson, Matthew R. Linford "Substrate Protection and Deprotection with Salt Films to Prevent Surface Contamination and Enable Selective Atomic Layer Deposition." *Applied Surface Science* **2020**, *526*, 146621.
98. Tatiana Zuppa Neto, Tahereh Avval, Pedro Augusto Morais, Wade Ellis, Sean Chapman, Anselmo de Oliveira, Matthew R. Linford, Paul B. Farnsworth, Nelson Antoniosi Filho "Direct Dielectric Barrier Discharge Ionization Promotes Rapid and Simple Lubricant Oil Fingerprinting." *J. Am. Soc. Mass Spectrom*. **2020**, *31(7),* 1525–1535.
99. Nicholas J. Smith, Cody V. Cushman, Matthew R. Linford, Robert A. Schaut, Joy Banerjee, Randall E. Youngman a, Lars Thomsen, Landon S. Fisher, Anders J. Barlow, Paul J. Pigram "Boron coordination structure at the surfaces of sodium borosilicate and aluminoborosilicate glasses by B K-edge NEXAFS" *Journal of Non-Crystalline Solids* **2020**, *545,* 120247.
100. George H. Major, Sean C. Chapman, Jeffrey T. Chapman, Joshua I. Wheeler, Shiladitya Chatterjee, Cody V. Cushman, Daniel H. Ess, Matthew R. Linford "Spectroscopic Ellipsometry of SU-8 Photoresist from 190 – 1680 nm (0.740 – 6.50 eV)" *Surface and Interface Analysis.* http://dx.doi.org/10.1002/sia.6867.
101. Matthew R. Linford. 'New Rules for Chess (and Life) during the Pandemic: Pandemic Chess'. Research Gate: **DOI:** 10.13140/RG.2.2.31959.09127.
102. Dhruv Shah, Dhananjay Patel, George H. Major, Morris Argyle, Matthew R. Linford. 'A New Holder/Container with a Porous Cover for Atomic Layer Deposition on Particles, with Transport and Detailed Characterization of the Resulting Materials'. *Surface and Interface Analysis* **2020**. https://doi.org/10.1002/sia.6895.
103. George H. Major, Neal Fairley, Peter M. A. Sherwood, Matthew R. Linford, Jeff Terry, Vincent Fernandez, Kateryna Artyushkova. 'Practical guide for curve fitting in X-ray photoelectron spectroscopy'. *J. Vac. Sci. Technol. A* **2020**, *38*, 061203. https://doi.org/10.1116/6.0000377.
104. George H. Major, Tahereh G. Avval, Behnam Moeini, Gabriele Pinto, Dhruv Shah, Varun Jain, Victoria Carver, William Skinner, Thomas R. Gengenbach, Christopher D. Easton, Alberto Herrera-Gomez, Tim S. Nunney, Donald R. Baer, Matthew R. Linford 'An Assessment of the Frequency and Nature of Erroneous X-ray Photoelectron Spectroscopy (XPS) Analyses in the Scientific Literature'. *J. Vac. Sci. Technol. A* **2020**, *38*, 061204. DOI: 10.1116/6.0000685.
105. Benjamen P. Reed, David J. H. Cant, Steve J. Spencer, Abraham Jorge Carmona-Carmona, Adam Bushell, Alberto Herrera-Gómez, Akira Kurokawa, Andreas Thissen, Andrew G. Thomas , Andrew J. Britton, Andrzej Bernasik, Anne Fuchs, Arthur P.

Baddorf, Bernd Bock, Bill Theilacker, Bin Cheng, David G. Castner, David J. Morgan, David Valley, Elizabeth A. Willneff, Emily F. Smith, Emmanuel Nolot, Fangyan Xie, Gilad Zorn, Graham C. Smith, Hideyuki Yasufuku, Jeffery L. Fenton, Jian Chen, Jonathan D. P. Counsell, Jörg Radnik, Karen J. Gaskell, Kateryna Artyushkova, Li Yang, Lulu Zhang, Makiho Eguchi, Marc Walker, Mariusz Hajdyła, Mateusz M. Marzec, Matthew R. Linford, Naoyoshi Kubota, Orlando Cortazar-Martínez, Paul Dietrich, Riki Satoh, Sven L. M. Schroeder, Tahereh G. Avval, Takaharu Nagatomi, Vincent Fernandez, Wayne Lake, Yasushi Azuma, Yusuke Yoshikawa, Alexander G. Shard 'Versailles Project on Advanced Materials and Standards interlaboratory study on intensity calibration for x-ray photoelectron spectroscopy instruments using low-density polyethylene' *J. Vac. Sci. Technol. A* **2020**, *38*, 063208. https://doi.org/10.1116/6.0000577.

ARTICLES IN VT&C MAGAZINE

106. George H. Major, Tahereh G. Avval, Neal Fairley, Matthew R. Linford. 'Why Data Smoothing is Generally a Bad Idea, explained from the Perspective of Convolution and the Fourier Transform.' *Vacuum Technology & Coating, February, 2020.*
107. George H. Major, Dhruv Shah, Vincent Fernandez, Neal Fairley, Matthew R. Linford. 'Advanced Line Shapes in X-Ray Photoelectron Spectroscopy I. The Asymmetric Lorentzian (LA) Line Shape.' *Vacuum Technology & Coating, March, 2020.*
108. George H. Major, Dhruv Shah, Tahereh G. Avval, Vincent Fernandez, Neal Fairley, Matthew R. Linford. 'Advanced Line Shapes in X-Ray Photoelectron Spectroscopy II. The Finite Lorentzian (LF) Line Shape (with some MATLAB code illustrating the use of the subplot function).' *Vacuum Technology & Coating, April, 2020.*
109. George H. Major, Dhruv Shah, Tuhin Roychowdhury, Tahereh G. Avval, Anders J. Barlow, Paul Pigram, Mark Greiner, Vincent Fernandez, Neal Fairley, Matthew R. Linford. 'Advanced Line Shapes in X-Ray Photoelectron Spectroscopy III. The LS 'Lorentzian Square' Line Shape.' *Vacuum Technology & Coating, May, 2020.*
110. George H. Major, Dhananjay I. Patel, Tahereh G. Avval, Anders J. Barlow, Paul Pigram, Vincent Fernandez, Neal Fairley, Matthew R. Linford. 'Advanced Line Shapes in X-Ray Photoelectron Spectroscopy IV. Using the Complementary Error Function to Fit the Fermi Edge of an XPS Spectrum.' *Vacuum Technology & Coating, June, 2020.*
111. George H. Major, Gabriele Pinto, Mark C. Biesinger, Matthew R. Linford. 'A Periodic Table that Shows the Most Intense/Most Used XPS Core Lines.' *Vacuum Technology & Coating, July, 2020.*
112. George H. Major, Dhananjay I. Patel, Matthew R. Linford. 'Using MATLAB's Live Editor to Simulate a Random Walk on a Surface.' *Vacuum Technology & Coating, August, 2020*.
113. George H. Major, David Morgan, Vincent Fernandez, Neal Fairley, Matthew R. Linford 'A Short Discussion of Pass Energy in X-ray Photoelectron Spectroscopy (XPS).' *Vacuum Technology & Coating, September, 2020*.
114. Tahereh G. Avval, Radhya W. Gamage, Sven Maehl, Neal Fairley, Daniel E. Austin, Matthew R. Linford 'Application of Laplace's Equation in Comparing the Electric Potentials of Hemispherical and Cylindrical Energy Analyzers.' *Vacuum Technology & Coating, October, 2020*.

115. Dhananjay I. Patel, Daniel Lippert, Dhruv Shah, Dongjin Seo, James N. Hilfiker, Matthew R. Linford 'Determining the Thicknesses of Thiol-on-Gold Monolayers by Spectroscopic Ellipsometry.' *Vacuum Technology & Coating, November, 2020*.
116. Behnam Moeini, Tahereh G. Avval, Gabriele Pinto, James N. Hilfiker, Matthew R. Linford 'Spectroscopic Ellipsometry of Transparent Uniaxial Anisotropic Thin Films.' *Vacuum Technology & Coating, December, 2020*.

PEER-REVIEWED CONTRIBUTIONS TO SPECTRAL DATABASES

117. Tuhin Roychowdhury, Dhruv Shah, James Hilfiker, Matthew R. Linford. "Polymethylmethacrylate (PMMA): Optical Properties from 191 - 1688 nm (0.735 - 6.491 eV) by Spectroscopic Ellipsometry." *Surface Science Spectra* **2020**, *27(1)*, 016002. DOI: 10.1116/1.5095422.
118. Varun Jain, Stephan Bahr, Paul Dietrich, Michael Meyer, Andreas Thißen, Matthew R. Linford. "Human Hair, Untreated, Colored, Bleached, and/or Treated with a Conditioner, by Near-Ambient Pressure XPS (NAP-XPS)." *Surface Science Spectra* **2020**, *27(1)*, 014001. DOI: 10.1116/1.5109425.
119. Dhananjay I. Patel, Alexandar Matic, Helmut Schlaad, Stephan Bahr, Paul Dietrich, Michael Meyer, Andreas Thißen, Sven Tougaard. "Effects of Background Gas Composition and Pressure on 1,4-Polymyrcene (and Polytetrafluoroethylene) Spectra in near-ambient pressure XPS" Accepted *Surface Science Spectra*.
120. Tahereh G. Avval, Grant T. Hodges, Stephan Bahr, Paul Dietrich, Michael Meyer, Andreas Thißen, Matthew R. Linford. "Polyethylene Terephthalate, PET, by Near-Ambient Pressure XPS" *Surface Science Spectra*. DOI: 10.1116/1.5129466.
121. Tahereh G. Avval, Victoria Carver, Sean C. Chapman, Stephan Bahr, Paul Dietrich, Michael Meyer, Andreas Thißen, Matthew R. Linford. "Clinoptilolite, a type of Zeolite, by Near-Ambient Pressure XPS" *Surface Science Spectra*. DOI: 10.1116/1.5129275.
122. Tahereh G. Avval, Sean C. Chapman, Jeffrey T. Chapman, Stephan Bahr, Paul Dietrich, Michael Meyer, Andreas Thißen, Matthew R. Linford. "Roman Coin, by Near-Ambient Pressure XPS" *Surface Science Spectra* **2020**, *27(1)*. DOI: 10.1116/1.5135326.
123. Dhananjay I. Patel, Dhruv Shah, Tuhin Roychowdhury, Joshua I. Wheeler, Daniel H. Ess, James N. Hilfiker, Matthew R. Linford. "Diphenylsiloxane – Dimethylsiloxane Copolymer: Optical Function from 191 – 1688 nm (0.735 – 6.491 eV) by Spectroscopic Ellipsometry" *Surface Science Spectra*. **2020**, *27(2)*. DOI: 10.1116/6.0000249.

PATENTS

124. RS Nielson, M Free, BR Williams, MR Linford, A Diwan, F Lane, S Ogden; U.S. Patent No. 10,534,120 'Wire grid polarizer with protected wires.' January 14, 2020.
125. Anubhav Diwan, Matthew R. Linford. U.S. Patent No. 10,752,989 'Methods of applying silane coatings.' Aug. 25, 2020.
126. RS Nielson, M Linford, A Diwan, MC George; U.S. Patent No. 10,761,252 'Wire grid polarizer with protective coating.' September 1, 2020.

2019 Publications

PEER-REVIEWED PAPERS

127. Shiladitya Chatterjee, Sean C. Chapman, George H. Major, Denis L. Eggett, Barry M. Lunt, Christopher R. Harrison, Matthew R. Linford. 'Informatics Analysis of Capillary Electropherograms of Autologously Doped and Undoped Blood' *Analytical Methods* **2019**, *11*, 1868 – 1878. DOI: 10.1039/C9AY00192A.
128. Donald R. Baer, Kateryna Artyushkova, Christopher. R. Brundle, James E. Castle, Mark H. Engelhard, Karen J. Gaskell, John. T. Grant, Richard T. Haasch, Matthew R. Linford, Cedric. J. Powell, Peter M. A. Sherwood, Vincent. S. Smentkowski 'Practical guides for x-ray photoelectron spectroscopy: First steps in planning, conducting, and reporting XPS measurements' *Journal of Vacuum Science & Technology A* **2019**, *37*, 031401; https://doi.org/10.1116/1.5065501.
129. Mona Sargazi, Matthew R. Linford, and Massoud Kaykhaii. 'Liquid Crystals in Analytical Chemistry: A Review.' *Critical Reviews in Analytical Chemistry* **2019**, *49(3)*, 243 - 255. DOI: 10.1080/10408347.2018.1512399.
130. Dhananjay I. Patel, Paul Dietrich, Andreas Thißen, and Matthew R. Linford. 'Near Ambient Pressure X-ray Photoelectron Spectroscopy (NAP-XPS). Characterization of Various Materials with the SPECS EnviroESCA Instrument' *Journal of Surface Analysis* **2019**, *26(2)*. (This is an extended abstract for the Practical Surface Analysis-19 Conference.)
131. Varun Jain, Tuhin Roychowdhury, Robert G. Kuimelis, Matthew R. Linford. 'Differences in Surface Reactivity in Two Synthetic Routes between HiPIMS and DC Magnetron Sputtered Carbon.' *Surface and Coatings Technology.* doi.org/10.1016/j.surfcoat.2019.125003.
132. Leo Lebanov, Laura Tedone, Massoud Kaykhaii, Matthew R Linford, Brett Paull 'Multidimensional gas chromatography in essential oil analysis. Part 1: Technical developments' *Chromatographia* **2019**, 82(1), 377 – 398.
133. Leo Lebanov, Laura Tedone, Massoud Kaykhaii, Matthew R Linford, Brett Paull 'Multidimensional gas chromatography in essential oil analysis. Part 2: Applications to characterization and identification' *Chromatographia* **2019**, 82(1), 399 – 414.
134. Joseph Ryan, Tiffany Kaspar, Carlo Pantano, Jarrett Rice, Cory Trivelpiece, Neil Hyatt, Claire Corkhill, Colleen Mann, Russell Hand, Michael Kirkham, Charles Crawford, Carol Jantzen, Jincheng Du, Xiaonan Lu, Mike Harrison, Cody Cushman, Matthew Linford, Nicholas Smith 'Physical and optical properties of the International Simple Glass' *Npj Mater. Degrad.* **2019**, *3*, 15. doi:10.1038/s41529-019-0069-2.

PEER-REVIEWED CONTRIBUTIONS TO SPECTRAL DATABASES

135. Dhananjay I Patel, Tuhin Roychowdhury, Varun Jain, Dhruv Shah, Tahereh G Avval, Shiladitya Chatterjee, Stephan Bahr, Paul Dietrich, Michael Meyer, Andreas Thißen, Matthew R Linford. "Introduction to near-ambient pressure x-ray photoelectron spectroscopy characterization of various materials." *Surface Science Spectra* **2019**, *26(1)*, 016801.
136. Dhruv Shah, Tuhin Roychowdhury, Stephan Bahr, Paul Dietrich, Michael Meyer, Andreas Thißen, and Matthew R. Linford. "Human tooth, by near-ambient pressure x-ray photoelectron spectroscopy." *Surface Science Spectra* **2019**, *26(1)*, 014016.

137. Tahereh Gholian Avval, Cody V. Cushman, Paul Dietrich, Michael Meyer, Andreas Thißen, Matthew R. Linford. "Dimethyl Sulfoxide, DMSO, by Near-Ambient Pressure XPS (NAP-XPS)". *Surface Science Spectra* **2019**, *26(1)*, 014020.
138. Dhruv Shah, Stephan Bahr, Paul Dietrich, Michael Meyer, Andreas Thißen, Matthew R Linford. "Nitrogen gas (N_2), by near-ambient pressure XPS." *Surface Science Spectra* **2019**, *26(1)*, 014023.
139. Tuhin Roychowdhury, Stephan Bahr, Paul Dietrich, Michael Meyer, Andreas Thißen, Matthew R Linford. "Calcite ($CaCO_3$), by near-ambient pressure XPS." *Surface Science Spectra* **2019**, *26(1)*, 014025.
140. Varun Jain, Stephan Bahr, Paul Dietrich, Michael Meyer, Andreas Thißen, Matthew R. Linford. "Polytetrafluoroethylene (PTFE), by Near-Ambient Pressure XPS (NAP-XPS)". *Surface Science Spectra* **2019**, *26(1)*, 014028.
141. Dhruv Shah, Dhananjay I Patel, Stephan Bahr, Paul Dietrich, Michael Meyer, Andreas Thißen, Matthew R Linford. "Liquid water, by near-ambient pressure XPS." *Surface Science Spectra* **2019**, *26(2)*, 024003.
142. Dhananjay I Patel, Sebastian Noack, Charlotte D Vacogne, Helmut Schlaad, Stephan Bahr, Paul Dietrich, Michael Meyer, Andreas Thißen, Matthew R Linford. "Poly(L-lactic acid), by near-ambient pressure XPS." *Surface Science Spectra* **2019**, *26(2)*, 024004.
143. Dhruv Shah, Stephan Bahr, Paul Dietrich, Michael Meyer, Andreas Thißen, Matthew R Linford. "Zirconium oxide particles, by near-ambient pressure XPS." *Surface Science Spectra* **2019**, *26(2)*, 024001.
144. Dhananjay I Patel, Stephan Bahr, Paul Dietrich, Michael Meyer, Andreas Thißen, Matthew R Linford. "Ambient air, by near-ambient pressure XPS." *Surface Science Spectra* **2019**, *26(2)*, 024002.
145. Dhruv Shah, Cody V Cushman, Stephan Bahr, Paul Dietrich, Michael Meyer, Andreas Thißen, Matthew R Linford. "Coca-Cola, by near-ambient pressure XPS." *Surface Science Spectra* **2019**, *26(2)*, 024005.
146. Tuhin Roychowdhury, Stephan Bahr, Paul Dietrich, Michael Meyer, Andreas Thißen, and Matthew R. Linford. "Hard Italian cheese, by near-ambient pressure XPS." *Surface Science Spectra* **2019**, *26(1)*, 014015.
147. Tahereh G Avval, Shiladitya Chatterjee, Grant T Hodges, Stephan Bahr, Paul Dietrich, Michael Meyer, Andreas Thißen, Matthew R Linford. "Oxygen gas, O_2(g), by near-ambient pressure XPS." *Surface Science Spectra* **2019**, *26(1)*, 014021.
148. Tuhin Roychowdhury, Stephan Bahr, Paul Dietrich, Michael Meyer, Andreas Thißen, Matthew R. Linford. "Kidney stone, by near-ambient pressure XPS." *Surface Science Spectra* **2019**, *26(1)*, 014017.
149. Dhananjay I Patel, Stephan Bahr, Paul Dietrich, Michael Meyer, Andreas Thißen, Matthew R Linford. "Argon gas, by near-ambient pressure XPS." *Surface Science Spectra* **2019**, *26(1)*, 014024.
150. Dhananjay I Patel, Dhruv Shah, Stephan Bahr, Paul Dietrich, Michael Meyer, Andreas Thißen, Matthew R Linford. "Water vapor, by near-ambient pressure XPS." *Surface Science Spectra* **2019**, *26(1)*, 014026.
151. Tuhin Roychowdhury, Stephan Bahr, Paul Dietrich, Michael Meyer, Andreas Thißen, Matthew R. Linford "Sesame Seeds, by Near-Ambient Pressure XPS." *Surface Science Spectra* **2019**, *26*, 014018, DOI: 10.1116/1.5050399. *Surface Science Spectra* **2019**, *26(1)*, 014018.

152. Tuhin Roychowdhury, Stephan Bahr, Paul Dietrich, Michael Meyer, Andreas Thißen, Matthew R Linford. “Clamshell, by near-ambient pressure XPS.” *Surface Science Spectra* **2019**, *26(1)*, 014019.
153. Varun Jain, Marit Kjærvik, Stephan Bahr, Paul Dietrich, Michael Meyer, Andreas Thißen, Matthew R. Linford. “Bovine Serum Albumin, Aqueous Solution, by Near-Ambient Pressure XPS (NAP-XPS).” *Surface Science Spectra* **2019**, *26(1)*, 014027.
154. Tahereh Gholian Avval, Cody V. Cushman, Paul Dietrich, Michael Meyer, Andreas Thißen, Matthew R. Linford. “Carbon Dioxide Gas, CO_2(g), by Near-Ambient Pressure XPS (NAP-XPS).” *Surface Science Spectra* **2019**, *26(1)*, 014022.
155. Dhruv Shah, Stephan Bahr, Paul Dietrich, Michael Meyer, Andreas Thißen, Matthew R. Linford. "Coffee bean, by near-ambient pressure XPS." *Surface Science Spectra* **2019**, *26(2)*. DOI: 10.1116/1.5110902.
156. Dhananjay I. Patel, James O’Tani, Stephan Bahr, Paul Dietrich, Michael Meyer, Andreas Thißen, Matthew R. Linford. "Ethylene glycol, by near-ambient pressure XPS." *Surface Science Spectra* **2019**, *26(2)*. DOI: 10.1116/1.5119256.
157. Varun Jain, Joshua John Wheeler, Daniel H. Ess, Sebastian Noack, Charlotte D. Vacogne, Helmut Schlaad, Stephan Bahr, Paul Dietrich, Michael Meyer, Andreas Thißen, Matthew R. Linford. “Poly(γ-Benzyl L-Glutamate) (PBLG), by Near-Ambient Pressure XPS.” *Science Spectra* **2019**, *26,* 024010. DOI: 10.1116/1.5109121.
158. Tahereh G. Avval, Cody V. Cushman, Philipp Brüner, Thomas Grehl, Hidde Brongersma, Matthew R. Linford. “Calcium Fluoride, CaF_2, and Gold Reference, by High Sensitivity - Low Energy Ion Scattering (HS-LEIS).” *Accepted Surface Science Spectra*.
159. Dhruv Shah, Tuhin Roychowdhury, Matthew R. Linford. “Polyethylene Glycol: Optical Constants from 191 - 1688 nm (0.735 - 6.491 eV) by Spectroscopic Ellipsometry.” *Accepted Surface Science Spectra*. DOI: 10.1116/1.5095949.
160. Dhruv Shah, Dhananjay I. Patel, Tuhin Roychowdhury, Dylan Jacobsen, Jacob Erickson, and Matthew R. Linford. "Optical Function of Atomic Layer Deposited Alumina (0.5 - 41.0 nm) from 191 - 1688 nm by Spectroscopic Ellipsometry”. *Surface Science Spectra* **2019**, *26*, 026001. DOI: 10.1116/1.5114827.

CONFERENCE PROCEEDINGS

161. Brian I. Johnson, Tahereh Gholian Avval, Grant Hodges, Victoria Carver, Karen Membreno, David D. Allred, Matthew R. Linford “Using ellipsometry and x-ray photoelectron spectroscopy for real-time monitoring of the oxidation of aluminum mirrors protected by ultrathin MgF_2 layers” Proceedings of SPIE Optics and Photonics, Aug. 11 – 15, 2019, San Diego, CA. http://dx.doi.org/10.1117/12.2529893.
162. Brian I. Johnson, Tahereh Gholian Avval, Grant P. Hodges, Karen Membreno, David D. Allred, Matthew R. Linford “Oxidation of Aluminum Protected by Wide Band Gap MgF2 Layers as Followed by X-ray Photoelectron Spectroscopy” Submitted to Proceedings of SVC (Society of Vacuum Coaters) TechCon 2019 (Long Beach, CA, April 27 – May 2, 2019).
163. Brian I. Johnson, Tahereh Gholian Avval, Grant Hodges, Karen Membreno, David D. Allred,

Matthew R. Linford 'Real-Time Monitoring of Aluminum Oxidation Through Wide Band Gap MgF_2 Layers for Protection of Space Mirrors'. Utah NASA Space Grant Consortium. Monday, May 6, 2019, Brigham Young University.

ARTICLES IN VT&C MAGAZINE

164. Dhruv Shah, Dhananjay I. Patel, Tahereh G. Avval, Nick Allen, Blaine D. Johs, Matthew R. Linford 'Installation of an FS-1 in situ Ellipsometer on an Atomic Layer Deposition (ALD) System. Part 1. Hardware Considerations.' *Vacuum Technology & Coating, January, 2019.*
165. Dhruv Shah, Dhananjay I. Patel, Tahereh G. Avval, Nick Allen, Blaine D. Johs, Matthew R. Linford 'Installation of an FS-1 in situ Ellipsometer on an Atomic Layer Deposition (ALD) System. Part 2. Software Considerations.' *Vacuum Technology & Coating, February, 2019.*
166. Brian I. Johnson, James N. Hilfiker, Matthew R. Linford 'Some Fundamentals of Spectroscopic Ellipsometry'. *Vacuum Technology & Coating, March, 2019.*
167. Tahereh G. Avval, Brian I. Johnson, James N. Hilfiker, Matthew R. Linford 'A Tutorial on Spectroscopic Ellipsometry (SE), 1. Determination of the Thicknesses of Thin Oxide Layers on Semiconductor Substrates.' *Vacuum Technology & Coating, April, 2019.*
168. Dhruv Shah, Dhananjay I. Patel, James N. Hilfiker, Matthew R. Linford 'A Tutorial on Spectroscopic Ellipsometry (SE), 2. The Cauchy Model' *Vacuum Technology & Coating, May, 2019.*
169. Dhananjay I. Patel, Dhruv Shah, James N. Hilfiker, Blaine Johs, Matthew R. Linford 'A Tutorial on Spectroscopic Ellipsometry (SE), 3. Surface Roughness' *Vacuum Technology & Coating, June, 2019.*
170. Dhruv Shah, Dhananjay I. Patel, James N. Hilfiker, Blaine Johs, Matthew R. Linford 'A Tutorial on Spectroscopic Ellipsometry (SE), 4. Using the Angle Offset when Fitting Ellipsometric Data' *Vacuum Technology & Coating, July, 2019.*
171. Tahereh G. Avval, Emily F. Smith, Neal Fairley, Matthew R. Linford 'Why the Signal-to-Noise (S/N) Ratio in X-ray Photoelectron Spectroscopy (XPS) Generally Decreases as Binding Energy Increases' *Vacuum Technology & Coating, August, 2019.*
172. Dhananjay I. Patel, Dhruv Shah, James N. Hilfiker, and Matthew R. Linford 'A Tutorial on Spectroscopic Ellipsometry (SE), 5. Using the Tauc-Lorentz and Cody-Lorentz Models to Describe the Absorption features of Amorphous Silicon (a-Si)'. *Vacuum Technology & Coating, September, 2019.*
173. Dhananjay I. Patel, Brian I. Johnson, Dhruv Shah, Neal Fairley, Matthew R. Linford 'XPS Peak Fitting. Optimizing the Percent Lorentzian Character in Gaussian-Lorentzian Sum and Product Functions'. *Vacuum Technology & Coating, October, 2019.*
174. Tahereh G. Avval, George H. Major, Behnam Moeini, Mark Engelhard, Matthew R. Linford. 'Plotting XPS Narrow Scans (and other Data) with MATLAB, 1. Using the 'plot' and 'subplot' functions.'. *Vacuum Technology & Coating, November, 2019, pgs. 35 - 37.*
175. Tahereh G. Avval, Behnam Moeini, George H. Major, Mark Engelhard, Matthew R. Linford. 'Plotting XPS Narrow Scans (and other Data) with MATLAB, 2. An Introduction to Handle Graphics.'. *Vacuum Technology & Coating, December, 2019, pgs. 34 - 36.*

PATENTS

176. Matthew R. Linford, Anubhav Diwan, Bhupinder Singh; U.S. Patent No. 10,422,725 'Solid phase coatings for microextraction.' Sept. 24, 2019.

2018 Publications

PEER-REVIEWED PAPERS

177. Shiladitya Chatterjee, Bhupinder Singh, Anubhav Diwan, Zheng Rong Lee, Mark H. Engelhard, Jeff Terry, H. Dennis Tolley, Neal B. Gallagher, Matthew R. Linford "A perspective on two chemometrics tools: PCA and MCR, and introduction of a new one: Pattern recognition entropy (PRE), as applied to XPS and ToF-SIMS depth profiles of organic and inorganic materials" *Applied Surface Science* **2018**, *433*, 994 - 1017.
178. Shiladitya Chatterjee and Matthew R. Linford "Reordered (Sorted) Spectra. A Tool for Understanding Pattern Recognition Entropy (PRE) and Spectra in General" *Bull. Chem. Soc. Jpn.* **2018**, *91*, 824 – 828. doi:10.1246/bcsj.20180027.
179. Vipul Gupta, Brett Paull, Matthew Linford etc. "Mixed-mode liquid chromatography on core shell stationary phases based on layer-by-layer nanodiamond/polyamine architecture" *Accepted Current Chromatography.*
180. Varun Jain, Mark C. Biesinger, Matthew Linford "The Gaussian-Lorentzian Sum, Product, and Convolution (Voigt) Functions in the Context of Peak Fitting X-ray Photoelectron Spectroscopy (XPS) Narrow Scans" *Applied Surface Science* **2018**, *447*, 548 – 553. https://doi.org/10.1016/j.apsusc.2018.03.190.
181. Cody V. Cushman, Philipp Brüner, Julia Zakel, Cameron Dahlquist, Brandon Sturgell, Thomas Grehl, Barry M. Lunt, Joy Banerjee, Nicholas Smith, Matthew R. Linford "Low Energy Ion Scattering (LEIS) of As-Formed and Chemically Modified Display Glass: Significant Differences between Surface and Bulk Compositions as Revealed by LEIS Peak Fitting of the Al/Si Envelope" *Applied Surface Science* **2018**, *455*, 18 - 31. https://doi.org/10.1016/j.apsusc.2018.04.127
182. Shiladitya Chatterjee, George H. Major, Massoud Kaykhaii, Matthew Linford "Using Pattern Recognition Entropy to Select Mass Chromatograms to Prepare Total Ion Chromatograms from Raw LC-MS Data" *J. Chrom. A.* **2018**, *1558*, 21 – 28. https://doi.org/10.1016/j.chroma.2018.04.042
183. Chatterjee, Shiladitya; Chapman, Sean; Lunt, Barry; Linford, Matthew 'Using Cross-Correlation with Pattern Recognition Entropy to Obtain Reduced Total Ion Current Chromatograms from Raw Liquid Chromatography-Mass Spectrometry Data' *Bull. Chem. Soc. Jpn.* **2018**, *91*, 1775 – 1780. doi:10.1246/bcsj.20180230.
184. Saini, Gaurav; Trenchevska, Olgica; Howell, Loren; Boyd, James; Smith, David; Jain Varun; Linford, Matthew "Performance Comparison of Three Chemical Vapor Deposited Aminosilanes in Peptide Synthesis: Effects of Silane on Peptide Stability and Purity" *Langmuir* **2018**, *34 (40)*, 11925–11932.
185. Dhruv Shah, Dhananjay I. Patel, Tuhin Roychowdhury, G. Bruce Rayner, Noel O'Toole, Donald R. Baer, Matthew R. Linford "A Tutorial on Interpreting X-ray Photoelectron Spectroscopy (XPS) Survey Spectra: Questions and Answers on Spectra from the Atomic

Layer Deposition (ALD) of Al_2O_3 on Silicon" *Journal of Vacuum Science & Technology B* **2018**, *36*, 062902; https://doi.org/10.1116/1.5043297.

186. Mona Sargazi , Matthew R. Linford, and Massoud Kaykhaii "Liquid Crystals in Analytical Chemistry: A Review" CRITICAL REVIEWS IN ANALYTICAL CHEMISTRY https://doi.org/10.1080/10408347.2018.1512399.

ENCYCLOPEDIA ARTICLE

187. Matthew R. Linford "The Chemomechanical Modification of Silicon with Macroscopic Diamond Tips and AFM Tips with Extension to Laser-Modification of the Material, Starting from Its Roots in Monolayers on Hydrogen-Terminated Silicon". *Encyclopedia of Interfacial Chemistry: Surface Science and Electrochemistry*, Chapter: 13142.

ARTICLES IN VT&C MAGAZINE

188. Cameron T. Dahlquist, Cody V. Cushman, J. Brigham Clawson, Scott S. Parker, Matthew R. Linford 'An Example of a Standard Operating Procedure for a Surface Analytical Instrument' *Vacuum Technology & Coating, January 2018*.
189. Brian I. Johnson, Grant Hodges, Cody Cushman, Joy Banerjee, Nicholas J. Smith, Matthew R. Linford 'Appropriate Backside Roughening is a Key for Good Spectroscopic Ellipsometry Analysis of Transparent Materials' *Vacuum Technology & Coating, February 2018*.
190. Cody Cushman, Julia Zakel, Landon S. Fisher, Joy Banerjee, Barry M. Lunt, Nicholas J. Smith, Matthew R. Linford 'Sample Charging in ToF-SIMS: How it Affects the Data that are Collected and How to Reduce it' *Vacuum Technology & Coating, March 2018*.
191. Dhananjay I. Patel, Catherine G. McKenas, Dhruv Shah, Matthew R. Lockett, Matthew R. Linford 'Multi-Instrument Characterization of Carbon Nanodot Materials: Description of Analytical Techniques and Specific Considerations Related to Research in the Lockett Group at UNC Chapel Hill, Part 1' *Vacuum Technology & Coating, April 2018*.
192. Dhananjay I. Patel, Catherine G. McKenas, Dhruv Shah, Tahereh Gholian Avval, Matthew R. Lockett, Matthew R. Linford 'Multi-Instrument Characterization of Carbon Nanodot Materials: Description of Two Analytical Techniques (LEIS and FTIR) with Specific Considerations Related to Research in the Lockett Group at UNC Chapel Hill, Part 2' *Vacuum Technology & Coating, May 2018*.
193. Dhananjay I. Patel, Catherine G. McKenas, Dhruv Shah, Matthew R. Lockett, James E. Patterson, Matthew R. Linford 'Multi-Instrument Characterization of Carbon Nanodot Materials: Description of Two More Analytical Techniques (ToF-SIMS and Raman) with Specific Considerations Related to Research in the Lockett Group at UNC Chapel Hill, Part 3' *Vacuum Technology & Coating, June 2018*.
194. James N. Hilfiker, Harland G. Thompkins, Matthew R. Linford 'A Review of Thompkins' and Hilfiker's Book Entitled: 'Spectroscopic Ellipsometry: Practical Applications to Thin Film Characterization.' *Vacuum Technology & Coating, July 2018.*
195. Matthew R. Linford, Tuhin Roychowdhury, Dhruv Shah 'Near Ambient Pressure XPS (NAP-XPS). A New Paradigm for the Technique.' *Vacuum Technology & Coating, August 2018.*

196. Brian I. Johnson, Matthew R. Linford 'It's Better to Make Good Measurements on Well-Prepared Samples than to Study Samples of Questionable Quality. Development of a Small Dry Box for Transferring Chemicals (Silanes) for CVD.' *Vacuum Technology & Coating, September 2018.*
197. Dhruv Shah and Matthew R. Linford 'A Review of Alan Spool's Book Entitled 'The Practice of ToF-SIMS: Time of Flight-Secondary Ion Mass Spectrometry.' *Vacuum Technology & Coating, October 2018.*
198. Matthew R. Linford 'A Short Quiz on ToF-SIMS Inspired by Alan Spool's Recent Book on Time-of-Flight Secondary Ion Mass Spectrometry.' *Vacuum Technology & Coating, November 2018.*
199. Tuhin Roychowdhury, Varun Jain, R.A. Synowicki, Matthew R. Linford 'Special Considerations for Analyzing Liquids by Spectroscopic Ellipsometry' *Vacuum Technology & Coating, December 2018.*

PATENTS

200. Matthew R. Linford, Anubhav Diwan, Bhupinder Singh; U.S. Patent No. 9,939,351. 'Solid phase coatings for microextraction'. April 10, 2018.
201. Anubhav Diwan, Matt Linford, Fred Lane, Matthew C. George; U.S. Patent No. 9,995,864. 'Wire grid polarizer with silane protective coating'. June 12, 2018.
202. Matt Linford, Anubhav Diwan, Fred Lane, Stew Nielsen, Ted Wangensteen; U.S. Patent No. 10,025,015 'Wire grid polarizer with phosphonate protective coating.' July 17, 2018.
203. Ted Wangensteen, Stew Nielson, Fred Lane, Matt Linford, Anubhav Diwan, Matthew C. George; U.S. Patent No. 10,054,717 'Oxidation and moisture barrier layers for wire grid polarizer.' Aug. 21, 2018.

PEER-REVIEWED CONTRIBUTIONS TO SPECTRAL DATABASES

204. Tuhin Roychowdhury, Cody V. Cushman, Ron A. Synowicki, Matthew R. Linford 'Polydimethylsiloxane (PDMS): Optical Constants from 191 – 1688 nm (0.735 – 6.491 eV) by Spectroscopic Ellipsometry'. Accepted Surface Science Spectra. DOI: 10.1116/1.5046735.

2017 Publications

PEER-REVIEWED PAPERS

205. Cody V. Cushman, Julia Zakel, Brandon Sturgell, George I. Major, Barry M. Lunt, Phillip Brüner, Thomas Grehl, Nicholas J. Smith, Matthew R. Linford "Time-of-Flight Secondary Ion Mass Spectrometry of Wet and Dry Chemically Treated Display Glass Surfaces" *J. Am. Ceram. Soc*. **2017**, *100 (10)*, 4770 - 4784.
206. Kevin R. Laughlin, Sarah L. Jamieson, Anthony C. Pearson, Hao Wang, Robert C. Davis, Matthew R. Linford, Barry M. Lunt "Thin film carbon nanofuses for permanent data storage" *ACS Omega* **2017**, *2 (6)*, 2432 - 2438.

207. Massoud Kaykhaii, Matthew R. Linford "Application of Microextraction Techniques Including SPME and MESI to the Thermal Degradation of Polymers: A review." *Critical Reviews in Analytical Chemistry* **2017**, *47(2)*, 172 – 176.

ENCYCLOPEDIA ARTICLE

208. Matthew R. Linford "The Chemomechanical Modification of Silicon with Macroscopic Diamond Tips and AFM Tips with Extension to Laser-Modification of the Material, Starting from Its Roots in Monolayers on Hydrogen-Terminated Silicon". *Encyclopedia of Interfacial Chemistry: Surface Science and Electrochemistry*, Chapter: 13142.

ARTICLES IN VT&C MAGAZINE

209. Shiladitya Chatterjee, Jacob C. Denning, Cody V. Cushman, Nicholas J. Smith, Paul Mack, Hussein Samha, George H. Major, Tim Nunney, Matthew R. Linford 'Trends in Advanced XPS Instrumentation. 2. Angle-Resolved XPS (AR-XPS) and XPS Surface Mapping' *Vacuum Technology & Coating, January 2017*.
210. Cody V. Cushman, Adam Roberts, Matthew R. Linford 'Trends in Advanced XPS Instrumentation. 3. The spherical mirror analyzer: obtaining spatially resolved XPS data without rastering' *Vacuum Technology & Coating, February 2017*.
211. Patrick Frederix and Matthew R. Linford 'Surface Analysis by Atomic Force Microscopy (AFM): Its Various Modes, Capabilities, and Comparison to and Integration with other Techniques' *Vacuum Technology & Coating, March 2017*.
212. Shiladitya Chatterjee, Tim Nunney, Cody Cushman, George H. Major, Nicholas J. Smith, Barry M. Lunt, and Matthew R. Linford 'Trends in Advanced XPS Instrumentation. 4. A Modern XPS Instrument and How to Manufacture it in just Four Days' *Vacuum Technology & Coating, April 2017*.
213. Matthew R. Linford and Michelle G. Linford 'A Case Study Illustrating Principles of Data Analysis (Chemometrics)' *Vacuum Technology & Coating, May 2017*.
214. Hao Wang and Matthew R. Linford 'MATLAB Programming, Part 1. Descriptions and Examples of Twenty-Five Useful Commands.' *Vacuum Technology & Coating, June 2017*.
215. Tuhin Roychowdhury, Varun Jain, Dhruv Shah, James E. Sudy, Duane Bingaman, Matthew R. Linford 'Good Surface Characterization Starts with Good Sample Preparation - Poor Equipment Maintenance Leads to Poor Sample Quality.' *Vacuum Technology & Coating, July 2017*.
216. Cody V. Cushman, Cameron T. Dahlquist, Paul Dietrich, Stephan Bahr, Andreas Thißen, Oliver Schaff, Joy Banerjee, Nicholas J. Smith, Matthew R. Linford 'Trends in Advanced XPS Instrumentation. 5. Near-Ambient Pressure XPS.' *Vacuum Technology & Coating, August 2017*.
217. Adam Roberts, Neal Fairley, Brian I. Johnson, Cody V. Cushman, Matthew R. Linford 'Trends in Advanced XPS Instrumentation. 6. Spectromicroscopy – A Technique for Understanding the Lateral Distribution of Surface Chemistry.' *Vacuum Technology & Coating, September 2017*.
218. Nikolas J. Podraza and Matthew R. Linford 'Archiving the Optical Constants of Materials with Surface Science Spectra'. *Vacuum Technology & Coating, October 2017*.

219. Dhruv Shah, Varun Jain, Tuhin Roychowdhury, James E. Sudy, Duane Bingaman, Matthew R. Linford 'Good Surface Characterization Starts with Good Sample Preparation - Poor Equipment Maintenance Leads to Poor Sample Quality, Part 2'. *Vacuum Technology & Coating, November 2017*.
220. Shiladitya Chatterjee, Andreas Thißen, Paul Dietrich, Christian Fleischer (at SPECS), Cody V. Cushman, Joy Banerjee, Nicholas J. Smith, Matthew R. Linford 'Trends in Advanced XPS Instrumentation. 7. Advanced Software Capabilities' *Vacuum Technology & Coating, December 2017*.

PEER-REVIEWED CONTRIBUTIONS TO SPECTRAL DATABASES

221. Brian I. Johnson, Cody V. Cushman, Joseph Rowley, Barry M. Lunt, Nicholas J. Smith, Andrew Martin, Matthew R. Linford "Optical constants of SiO_2 from 196 to 1688 nm (0.735–6.33 eV) from 20, 40, and 60 nm films of reactively sputtered SiO_2 on Eagle XG® glass by spectroscopic ellipsometry" *Surf. Sci. Spectra*, **2017**, *24(2)*, 026002 doi.org/10.1116/1.5008513
222. Cody V. Cushman, Brian I. Johnson, Andrew Martin, Barry M. Lunt, Nicholas J. Smith, Matthew R. Linford "Eagle XG® Glass: Optical Constants from 196 – 1688 nm (0.735 - 6.32 eV) by Spectroscopic Ellipsometry" *Surf. Sci. Spectra*, **2017**, *24(2)*, 026001 doi: 10.1116/1.4997439

PATENTS

223. Matt Linford, Anubhav Diwan, Fred Lane, Stew Nielson, Ted Wangensteen U.S. Patent No. 9,703,028. 'Wire grid polarizer with phosphonate protective coating'. July 11, 2017.

2016 Publications

PEER-REVIEWED PAPERS

224. Bhupinder Singh, Stacey J. Smith, David S. Jensen, Hodge F. Jones, Andrew E. Dadson, Paul B. Farnsworth, Richard Vanfleet, Jeffrey K. Farrer, Matthew R. Linford "Multi-instrument characterization of five nanodiamond samples: a thorough example of nanomaterial characterization" *Anal. Bioanal. Chem*. **2016**, *408 (4)*, 1107 - 1124. DOI: 10.1007/s00216-015-9207-z.
225. Diwan, Anubhav; Singh, Bhupinder; Roychowdhury, Tuhin; Yan, DanDan; Tedone, Laura; Nesterenko, Pavel; Paull, Brett; Sevy, Eric T.; Shellie, Robert; Kaykhaii, Massoud; Linford, Matthew R. "Porous, High Capacity, Coatings for Solid Phase Microextraction (SPME) by Sputtering" *Anal. Chem.*, **2016**, *88* (3), 1593–1600. **DOI:** 10.1021/acs.analchem.5b03181.
226. Jacob D. Bagley, H. Dennis Tolley, Matthew R. Linford "Reevaluating the Conventional Approach for Analyzing Spectroscopic Ellipsometry Psi/Delta vs. Time Data. Additional Statistical Rigor May Often Be Appropriate." *Surf. Interface Anal.* **2016**, *48*, 186–195. DOI: 10.1002/sia.5938.

227. Anubhav Diwan, Bhupinder Singh, Christopher J. Hurley, Matthew R. Linford "Layer-by–Layer deposition of nitrilotris(methylene)triphosphonic acid and Zr(IV): an XPS, ToF-SIMS, Ellipsometry, and AFM study." *Surf. Interface Anal.* **2016**, *48*, 105 – 110.
228. Cody V. Cushman, Philipp Brüner, Julia Zakel, George Major, Barry M. Lunt, Thomas Grehl, Nicholas J. Smith, and Matthew R. Linford "Low Energy Ion Scattering (LEIS). A Practical Introduction to its Theory, Instrumentation, and Applications." *Analytical Methods*, **2016**, *8*, 3419 – 3439. DOI: 10.1039/c6ay00765a.
229. Bhupinder Singh, Anubhav Diwan, Varun Jain, Alberto Herrera-Gomez, Jeff Terry, Matthew R. Linford "Uniqueness Plots. A Simple Graphical Tool for Identifying Poor Peak Fits in X-ray Photoelectron Spectroscopy." *Applied Surface Science*, **2016**, *387*, 155 – 162.
230. Shiladitya Chatterjee, George H. Major, Barry M. Lunt, Massoud Kaykhaii, Matthew R. Linford "Polyallylamine as an Adhesion Promoter for SU-8 Photoresist." *Microscopy and Microanalysis*, **2016**, 964 – 970, doi.org/10.1017/S1431927616011727.
231. Matthew R. Linford "The Parable of the Benevolent Father and Son". *Interpreter: A Journal of Mormon Scripture*, **2016**, *22*, 149 – 178.

PEER-REVIEWED CONTRIBUTIONS TO SPECTRAL DATABASES

232. Cody V. Cushman, Brandon A. Sturgell, Andrew Martin, Nicholas J. Smith, Matthew R. Linford "Eagle XG® Glass. Optical Constants from 230 – 1690 nm by Spectroscopic Ellipsometry." *Surf. Sci. Spectra*, 2016, **23**, 55 – 60. http://dx.doi.org/10.1116/1.4954226.

CONFERENCE PROCEEDINGS

233. Matthew R. Linford, Bhupinder Singh, Daniel Velázquez, Jeff Terry, Jacob D. Bagley, Dennis H. Tolley, Anubhav Diwan, Varun Jain, Alberto Herrera-Gomez. "New Data Analysis Tools for X-ray Photoelectron Spectroscopy (XPS) and Spectroscopic Ellipsometry (SE): Uniqueness Plots and Width Functions in XPS, and Distance, Principal Component, and Cluster Analyses in SE". Microscopy and Microanalysis, Columbus, OH, 2016.
234. Shiladitya Chatterjee, George H. Major, and Matthew R. Linford "Polyallylamine as an Adhesion Promoter for SU-8 Photoresist". Microscopy and Microanalysis, Columbus, OH, 2016. (Note that this document was submitted late to the conference as a post-deadline poster paper. According to the rules of the conference: "Post-deadline posters are not included in the program proceedings and are not considered "published"." and "Post-deadline poster papers will be available for review and download (PDF) on the M&M 2016 site around July 12.")

ARTICLES IN VT&C MAGAZINE

235. Cody V. Cushman and Matthew R. Linford 'A (Very Incomplete) Report of AVS 2015' *Vacuum Technology & Coating, January 2016*.
236. Cody V. Cushman, Philipp Brüner, Julia Zakel, George Major, Barry M. Lunt, Thomas Grehl, Nicholas J. Smith, and Matthew R. Linford 'A Pictorial View of LEIS and ToF-SIMS Instrumentation' *Vacuum Technology & Coating, February 2016*.

237. Hao Wang and Matthew R. Linford 'Introduction to the Laplace Transform. A Tool for Solving the Problem of the Damped, Driven Harmonic Oscillator, a Model for the AFM Tip' *Vacuum Technology & Coating, March 2016*.
238. Shiladitya Chatterjee and Matthew R. Linford 'Principal Components Analysis (PCA): A Pictorial Tutorial' *Vacuum Technology & Coating, April 2016*.
239. Jacob D. Bagley and Matthew R. Linford 'Using Spectroscopic Ellipsometry to Determine Material Stability. A Better Understanding of this Approach through Statistics' *Vacuum Technology & Coating, May 2016*.
240. Brian I. Johnson, Cody V. Cushman, Barry M. Lunt, Massoud Kaykhaii, and Matthew R. Linford 'An Introduction to Silanes, their Chemical Vapor Deposition onto Si/SiO_2, and Characterization of the Resulting Monolayers' *Vacuum Technology & Coating, June 2016*.
241. Cody V. Cushman, Nicholas Smith, Barry M. Lunt, Massoud Kaykhaii, Nikolas Podraza, and Matthew R. Linford 'An Introduction to Modeling in Spectroscopic Ellipsometry, Focusing on Models for Transparent Materials: the Cauchy and Sellmeier Models.' *Vacuum Technology & Coating, July 2016*.
242. Bhupinder Singh, Alberto Herrera-Gomez, Jeff Terry, and Matthew R. Linford 'Good Practices for XPS Peak Fitting, II' *Vacuum Technology & Coating, August 2016*.
243. Shiladitya Chatterjee and Matthew R. Linford 'Highlights from the 2016 Microscopy & Microanalysis Meeting in Columbus, OH. A New MS/MS Imaging ToF-SIMS Mass Spectrometer, a Very Low Cost AFM, and a Remote Plasma Cleaning System.' *Vacuum Technology & Coating, September 2016*.
244. Bhupinder Singh, Anubhav Diwan, Varun Jain, Hussein Samha, Alberto Herrera-Gomez, Jeff Terry, and Matthew R. Linford 'Uniqueness Plots in Spectroscopic Ellipsometry and now in X-ray Photoelectron Spectroscopy: a Straightforward Way to Show You have a Statistically Meaningful Fit.' *Vacuum Technology & Coating, October 2016*.
245. Cody V. Cushman, Shiladitya Chatterjee, George H. Major, Nicholas J. Smith, Adam Roberts, Matthew R. Linford 'Trends in Advanced XPS Instrumentation. 1. Overview of the Technique, Automation, High Sensitivity, Imaging, Snapshot Spectroscopy, Gas Cluster Ion Beams, and Multiple Analytical Techniques on the Instrument.' *Vacuum Technology & Coating, November 2016*.
246. Matthew R. Linford, Tuhin Roychowdhury, Brian I. Johnson, Nitish Bhardwaj 'A Very Incomplete Report on AVS 2016 in Nashville, TN.' *Vacuum Technology & Coating, December 2016*.

PATENTS

247. Matthew R. Linford and Chuan-Hsi Hung U.S. Patent No. 9,511,575. 'Sonication for improved particle size distribution of core-shell particles'. Dec. 6, 2016.
248. Matthew R. Linford European Patent EP 2 288 440 B1. 'POROUS COMPOSITE PARTICULAR MATERIALS, METHODS OF MAKING AND USING THE SAME, AND RELATED APPARATUSES.'. June 22, 2106.
249. Matthew R. Linford, David Scott Jensen, Landon Andrew Wiest U.S. Patent No. 9,283,543. 'MODIFIED DIAMOND PARTICLES'. Mar. 15, 2016.

250. Matthew R. Linford, Robert C. Davis, Richard R. Vanfleet, David Scott Jensen, Li Yang, Jun Song U.S. Patent No. 9,283,541. 'THIN LAYER CHROMATOGRAPHY PLATES AND RELATED METHODS'. Mar. 15, 2016.

2015 Publications

PEER-REVIEWED PAPERS

251. Supriya S. Kanyal, Tim T. Haebe, Cody V. Cushman, Manan Dhunna, Tuhin Roychowdhury, Paul B. Farnsworth, Gertrud E. Morlock, Matthew R. Linford "Microfabrication, separations, and detection by mass spectrometry on ultrathin-layer chromatography plates prepared via the low-pressure chemical vapor deposition of silicon nitride onto carbon nanotube templates" *J. Chrom. A*. **2015**, *1404*, 115 – 123. DOI:10.1016/j.chroma.2015.05.053.
252. Nitesh Madaan, Anubhav Diwan and Matthew R. Linford 'Fluorine plasma treatment of bare and nitrilotris(methylene)triphosphonic acid (NP) protected aluminum: an XPS and ToF-SIMS study'. *Surf. Interface Anal.* **2015**, *47*, 56–62. DOI: 10.1002/sia.5666.
253. Supriya Kanyal, Bhupinder Singh, Daniel Jankowski, Matthew R. Linford 'Hydroxylation of the Silica in Microfabricated Thin Layer Chromatography Plates as Probed by Time-of-Flight Secondary Ion Mass Spectrometry and Diffuse Reflectance Infrared Fourier Transform Spectroscopy'. *Surf. Interface Anal.* **2015**, *47*, 340–344. DOI 10.1002/sia.5713.
254. Cody V. Cushman and Matthew R. Linford "Using the Plan View to Teach Basic Crystallography in General Chemistry" *J. Chem. Ed*. DOI: 10.1021/acs.jchemed.5b00011.
255. Venkatareddy Udumula, Jefferson H. Tyler, Donald L. Davis, Hao Wang, Matthew R. Linford, Paul S. Minson, David J. Michaelis "A Dual Optimization Approach to Bimetallic Nanoparticle Catalysis: Impact of M1:M2 Ratio and Supporting Polymer Structure on Reactivity" *ACS Catal.* **2015**, *5*(6), 3457–3462, DOI: 10.1021/acscatal.5b00830
256. Chuan-Hsi Hung, Janusz Zukowski, David S. Jensen, Andrew J. Miles, Clayton Sulak, Andrew E. Dadson, Matthew R. Linford "Separation of Cannabinoids on Three Different Mixed-Mode Columns Containing Carbon/Nanodiamond/Amine-Polymer Superficially Porous Particles" *J. Sep. Sci.* **2015**, *38*(17), 2968–2974, DOI: 10.1002/jssc.201500156
257. Diwan, Anubhav; Linford, Matthew R. "Superhydrophobic Surfaces with very low Hysteresis Prepared by Aggregation of Silica Nanoparticles during in situ Urea-Formaldehyde Polymerization" *Journal of Nanoscience and Nanotechnology*, **2015**, *15*, 10022-10036.
258. Nitesh Madaan, Naomi Romriell, Joshua Tuscano, Helmut Schlaad, Matthew R. Linford "Introduction of Thiol Moieties, including their Thiol-ene Reactions and Air Oxidation, onto Polyelectrolyte Multilayer Substrates" *Journal of Colloid And Interface Science,* **2015**, 199-205 DOI information: 10.1016/j.jcis.2015.08.017
259. Chuan-Hsi Hung, Bhupinder Singh, Michael G. Landowski, Mohammed Ibrahim, Andrew J. Miles, David S. Jensen, Michael A. Vail, Andrew E. Dadson, Stacey J. Smith, Matthew R. Linford "Multi-Instrument Characterization of Poly(Divinylbenzene) Microspheres for Use in Liquid Chromatography: As Received, Air Oxidized, Carbonized, and Acid Treated" *Surface and Interface Analysis* **2015**, *47*, 815 - 823. DOI 10.1002/sia.5713.

PEER-REVIEWED CONTRIBUTIONS TO SPECTRAL DATABASES

260. Supriya Kanyal; David S. Jensen; Zihua Zhu; Matthew R. Linford 'Silicon (100)/SiO_2 by ToF-SIMS'. *Surface Science Spectra* **2015**, *22(2)*, 1 - 6. DOI: 10.1116/1.4930256.
261. Supriya Kanyal; David S. Jensen; Zihua Zhu; Matthew R. Linford 'Al_2O_3 e-beam evaporated onto silicon (100)/SiO_2 by ToF-SIMS'. *Surface Science Spectra* **2015**, *22(2)*, 7 - 13. DOI: 10.1116/1.4930928.
262. Supriya Kanyal; David S. Jensen; Zihua Zhu; Matthew R. Linford 'Thermally evaporated (oxide) iron on an alumina barrier layer by ToF-SIMS'. *Surface Science Spectra* **2015**, *22(2)*, 14 - 21. DOI: 10.1116/1.4930929.
263. Supriya Kanyal; David S. Jensen; Zihua Zhu; Matthew R. Linford 'Thermally Annealed Iron Thin Film on an Alumina Barrier Layer by ToF-SIMS'. *Surface Science Spectra* **2015**, *22(2)*, 22 - 28. DOI: 10.1116/1.4931977.
264. Supriya Kanyal; David S. Jensen; Zihua Zhu; Matthew R. Linford 'Multiwalled Carbon Nanotube Forest Grown via Chemical Vapor Deposition from Iron Catalyst Nanoparticles by ToF-SIMS'. *Surface Science Spectra* **2015**, *22(2)*, 29 - 33. DOI: 10.1116/1.4931984.

CONFERENCE PROCEEDINGS

265. Blake Dastrup, Barry M. Lunt, Arthur Robbins, Hao Wang, Robert C. Davis, Matthew R. Linford 'Multiphysics (COMSOL) Modeling of Carbon Nanofuses used as the Fundamental Memory Elements in Long-Lasting Solid State Data Storage Devices'. International Symposium on Optical Memory (ISOM) for the Proceedings of ISOM 2015, Toyama, Japan, Oct. 4 –8, **2015**.

PATENTS

266. Matthew R. Linford, Andrew E. Dadson, Landon A. Wiest, David S. Jensen U.S. Patent 9,192,915. 'POROUS COMPOSITE PARTICULAR MATERIALS, METHODS OF MAKING AND USING SAME, AND RELATED APPARATUSES'. Nov. 24, 2015.
267. Matthew R. Linford, Robert C. Davis, Richard R. Vanfleet, David Scott Jensen, Li Yang, Jun Song U.S. Patent No. 9,164,068. 'Thin layer chromatography plates and related methods.' Oct. 20, 2015.
268. Matthew R. Linford, Michael A. Vail U.S. Patent No. 9,150,419. 'Polycrystalline articles for reagent delivery'. Oct. 6, 2015.
269. Matthew R. Linford, David Scott Jensen, Andrew E. Dadson, Robert C. Davis U.S. Patent No. 9,126,227 B2. 'THIN LAYER CHROMATOGRAPHY PLATES AND RELATED METHODS OF MANUFACTURE INCLUDING PRIMING PRIOR TO INFILTRATION WITH STATIONARY PHASE AND/OR PRECURSOR THEREOF.' Sept. 8, 2015.
270. Linford, M.R. U.S. Patent No. 9,005,436. 'Porous composite particulate materials, methods of making and using same, and related apparatuses'. April 14, 2015.

ARTICLES IN VT&C MAGAZINE

271. Bhupinder Singh, Ronald Hesse, and Matthew R. Linford 'Good Practices for XPS (and other Types of) Peak Fitting. Use Chi Squared, Use the Abbe Criterion, Show the Sum of Fit

Components, Show the (Normalized) Residuals, Choose an Appropriate Background, Estimate Fit Parameter Uncertainties, Limit the Number of Fit Parameters, Use Information from Other Techniques, and Use Common Sense.' *Vacuum Technology & Coating, December 2015*.

272. Cody V. Cushman, Thomas Grehl, and Matthew R. Linford 'Low Energy Ion Scattering (LEIS). V. Static and Sputter Depth Profiling, and Application to Semiconductor Devices.' *Vacuum Technology & Coating, November 2015*.
273. Bhupinder Singh and Matthew R. Linford 'An Introduction to the Equivalent Width and the Autocorrelation Width. Their Possible Applications in XPS Narrow Scan Analysis', *Vacuum Technology & Coating, October 2015*.
274. Hao Wang, David J. Michaelis, Matthew R. Linford 'Surface/Material Analysis of Catalytic Ruthenium-Cobalt Nanoparticles in a Polystyrene Matrix. A Case Study', *Vacuum Technology & Coating, September 2015*.
275. Tuhin Roychowdhury, Cody V. Cushman, George H. Major, Matthew R. Linford 'The Surface Analytical Chemistry (XPS) and Polymer Chemistry of the Acrylates and Methacrylates, an Introduction', *Vacuum Technology & Coating, August 2015*.
276. Cody V. Cushman, Thomas Grehl, and Matthew R. Linford 'Low Energy Ion Scattering (LEIS). IV. Applications to Catalysis.' *Vacuum Technology & Coating, July 2015*.
277. Cody V. Cushman, Thomas Grehl, and Matthew R. Linford 'Low Energy Ion Scattering (LEIS). III. Quantitation in LEIS.' *Vacuum Technology & Coating, June 2015*.
278. Cody V. Cushman, Thomas Grehl, and Matthew R. Linford 'Low Energy Ion Scattering (LEIS). II. Instrumentation and Application to Solid Oxide Fuel Cells' *Vacuum Technology & Coating, May 2015*.
279. Cody V. Cushman, Thomas Grehl, and Matthew R. Linford 'Low Energy Ion Scattering (LEIS). I. The fundamentals.' *Vacuum Technology & Coating, April 2015*.
280. Hao Wang and Matthew R. Linford 'X-ray Photoelectron Spectroscopy and Auger Electron Spectroscopy: Comparison and Basic Principles' *Vacuum Technology & Coating, March 2015*.
281. Cody V. Cushman, George H. Major, and Matthew R. Linford 'A Discussion of Terminology Related to Surface Analysis, and of Sample Preparation, Mounting, and Handling for Surface Sensitive Analytical Methods, as Guided by Three ASTM Standards' *Vacuum Technology & Coating, February 2015*.
282. Anubhav Diwan and Matthew R. Linford 'An Introduction to Classical Least Squares (CLS) and Multivariate Curve Resolution (MCR) as Applied to UV-VIS, FTIR, and ToF-SIMS' *Vacuum Technology & Coating, January 2015*.
283. Anubhav Diwan and Matthew R. Linford 'A Brief Introduction to Matrix Algebra' *Vacuum Technology & Coating, January 2015*.

APPLICATION NOTES

284. Hung, C.-H.; Zukowski, J.; Jensen, D.S.; Miles, A.J.; Dadson, A.E.; Linford, M.R. 'FLARE C18 Mixed-Mode Column: Separation of Gensenosides Re and Rd by LC-MS'. Diamond Analytics Application Note: DA1016-A.

2014 Publications

PEER-REVIEWED PAPERS

285. Bhupinder Singh, Daniel Velázquez, Jeff Terry, and Matthew R. Linford. 'Comparison of The Equivalent Width, the Autocorrelation Width, and the Variance as Figures of Merit for XPS Narrow Scans'. *Journal of Electron Spectroscopy and Related Phenomena* **2014**, *197*, 112 – 117. http://dx.doi.org/10.1016/j.elspec.2014.10.007.
286. Bhupinder Singh, Daniel Velásquez, Jeff Terry, Matthew R. Linford. 'The Equivalent Width as a Figure of Merit for XPS Narrow Scans.' *Journal of Electron Spectroscopy and Related Phenomena*. **2014**, *197*, 56 – 63. http://dx.doi.org/10.1016/j.elspec.2014.06.008.
287. Gupta, V.; Ganegoda, H.; Engelhard, M.H.; Terry, J.; Linford, M.R. 'Assigning Oxidation States to Organic Compounds via Predictions from X-ray Photoelectron Spectroscopy: A Discussion of Approaches and Recommended Improvements.' *J. Chem. Educ.* **2014**, *91(2)*, 232–238. DOI: 10.1021/ed400401c.
288. Hao Wang; Nitesh Madaan; Jacob Bagley; Anubhav Diwan; Yiqun Liu; Robert C. Davis; Barry M. Lunt; Stacey J. Smith; Matthew R. Linford. 'Spectroscopic ellipsometric modeling of a Bi-Te-Se write layer of an optical data storage device as guided by atomic force microscopy, scanning electron microscopy, and X-ray diffraction'. *Thin Solid Films* **2014**, *569*, 124 – 130.
289. Supriya S. Kanyal, David S. Jensen, Andrew E. Dadson, Richard R. Vanfleet, Robert C. Davis, Matthew R. Linford. 'Atomic Layer Deposition of Aluminum-Free Silica onto Patterned Carbon Nanotube Forests in the Preparation of Microfabricated Thin-Layer Chromatography Plates'. *Journal of Planar Chromatography – Modern TLC* **2014**, *27(3)*, 151–156. DOI: 10.1556/JPC.27.2014.3.1.
290. Vipul Gupta, Joshua A. Tuscano, Naomi R. Romriell, Robert C. Davis, Matthew R. Linford. "Data and Device Protection: A ToF-SIMS, Wetting, and XPS Study of an Apple iPod Nano". *Surface and Interface Analysis* **2014**, *46(2)*, 106–108. DOI: 10.1002/sia.5352.
291. Vipul Gupta, Anubhav Diwan, Delwyn Evans, Clive Telford, Matthew R. Linford "Self-Termination of Gas-Phase Layer-by-Layer Growth of an Aza silane and Water on Planar Silicon and Nylon Substrates" *J. Vac. Sci. Technol. B*. **2014** 32(6), 061803-1 - 061803-9. http://dx.doi.org/10.1116/1.4899936.

CONFERENCE PROCEEDINGS

292. Lunt, B.M.; Linford, M.R.; Davis, R.C. 'Permanent Digital Data Storage: An Overview' International Symposium on Optical Memory (ISOM), Oct. 20 – 23, 2014. Hsinchu, Taiwan.
293. Lunt, B.M.; Linford, M.R. 'Current Archiving Technology: An Update' iPRES (International Conference on Preservation of Digital Objects), October 6 – 10, 2014. State Library of Victoria, Melbourne, Australia.
294. Jacob D. Bagley, Hao Wang, Anubhav Diwan, Robert C. Davis, Barry M. Lunt, Matthew R. Linford 'Exploring Sputtered Carbon for the Nanofuses in Solid-State Long-Term Digital Data Storage' International Symposium on Optical Memory (ISOM), Oct. 20 – 23, 2014. Hsinchu, Taiwan.
295. Kevin Laughlin, Hao Wang, Barry M. Lunt, Robert C. Davis, Matthew R. Linford 'Prototyping Permanent Data Storage Elements with Electron Beam Lithography' International Symposium on Optical Memory (ISOM), Oct. 20 – 23, 2014. Hsinchu, Taiwan.

296. Kevin Laughlin, Hao Wang, Barry M. Lunt, Robert C. Davis, Matthew R. Linford 'Preparation and Properties of Carbon Nanofuses for Permanent Data Storage' International Symposium on Optical Memory (ISOM), Oct. 20 – 23, 2014. Hsinchu, Taiwan.
297. Hao Wang, Kevin Laughlin, Jake Bagley, Barry M. Lunt, Robert C. Davis, Matthew R. Linford 'XPS and ToF-SIMS Analysis of the Information Storage Medium of a Permanent Write-Once-Read-Many (WORM) Archival, Solid State Data Storage Device' International Symposium on Optical Memory (ISOM), Oct. 20 – 23, 2014. Hsinchu, Taiwan.
298. Hao Wang, Kevin Laughlin, Jake Bagley, Barry M. Lunt, Robert C. Davis, Matthew R. Linford 'Development of an Optical Model, guided by AFM, for Arc-Deposited Carbon Thin Films in Solid State Data Storage Elements' International Symposium on Optical Memory (ISOM), Oct. 20 – 23, 2014. Hsinchu, Taiwan.

PATENTS

299. Linford, M.R.; Saini, G. U.S. Patent No. 8,846,161. 'Hydrophobic coating and method'. September 30, **2014**.
300. Linford, M.R.; Jensen, D.S.; Dadson, A.E.; Davis, R.C. U.S. Patent No. 8,702,984. 'Thin layer chromatography plates and related methods of manufacture including priming prior to infiltration with stationary phase and/or precursor thereof'. April 22, **2014**.
301. Linford, M.R.; Hung, C.-H. U.S. Patent No. 8,658,039. 'Sonication for improved particle size distribution of core-shell particles'. February 25, **2014**.
302. Linford, M.R. Canadian Patent No. CA 2,723,651 "POROUS COMPOSITE PARTICULATE MATERIALS, METHODS OF MAKING AND USING SAME, AND RELATED APPARATUSES" Feb. 11, **2014**.

ARTICLES IN VT&C MAGAZINE

303. Anubhav Diwan and Matthew R. Linford 'Models in Ellipsometry: The 'No Model' Model (Just Monitoring Psi and Delta)' *Vacuum Technology & Coating, November 2014*.
304. Matthew R. Linford 'The Blind Men and the Elephant as a Metaphor for the Multi-Instrument Analysis of Surfaces and Materials. Analysis of the Surfaces and Materials in Microfabricated Thin Layer Chromatography Plates' *Vacuum Technology & Coating, September 2014*.
305. Matthew R. Linford 'The Gaussian-Lorentzian Sum, Product, and Convolution (Voigt) Functions Used in Peak Fitting XPS Narrow Scans, and an Introduction to the Impulse Function' *Vacuum Technology & Coating, July 2014*.
306. Matthew R. Linford 'An Introduction to Convolution with a Few Comments Beforehand on XPS' *Vacuum Technology & Coating, June 2014*.
307. Matthew R. Linford 'A Discussion of Aspects of a Paper by Caporali, Bardi, and Lavacchi on LEIS and XPS' *Vacuum Technology & Coating, May 2014*.
308. Matthew R. Linford 'An Introduction to Time-of-Flight Secondary Ion Mass Spectrometry (ToF-SIMS)' *Vacuum Technology & Coating, April 2014*.
309. Matthew R. Linford 'Understanding One of the Governing Equations of XPS and Highlights from a Recent Paper by Akagawa and Fujiwara' *Vacuum Technology & Coating, March 2014*.

310. Matthew R. Linford 'Introduction to Surface and Material Analysis and to Various Analytical Techniques' *Vacuum Technology & Coating, Feb. 2014*.

APPLICATION NOTES

311. Hung, C.-H.; Davis, T.C.; Jensen, D.S.; Miles, A.J.; Zukowski, J.; Dadson, A.E.; Linford, M.R. 'FLARE C18 Mixed-Mode Column: Alkaloids'. Diamond Analytics Application Note: DA1013-A
312. Hung, C.-H.; Davis, T.C.; Jensen, D.S.; Miles, A.J.; Zukowski, J.; Dadson, A.E.; Linford, M.R. 'FLARE C18 Mixed-Mode Column: Tricyclic Antidepressants (TCAs)'. Diamond Analytics Application Note: DA1001-C
313. Hung, C-H.; Jensen, D.S.; Dadson, A.E.; Linford, M.R. 'Regeneration of FLARE C18 Mixed-Mode Column after Exposure to TFA'. Diamond Analytics Application Note DA-11.
314. Hung, C-H.; Jensen, D.S.; Miles, A.J.; Zukowski, J.; Dadson, A.E.; Linford, M.R. 'FLARE C18 Mixed-Mode Column: Separation of Apo-Transferrin and Bovine Serum Albumin (BSA) by LC-MS'. Diamond Analytics Application Note: DA1014-A.

2013 Publications

PEER-REVIEWED PAPERS

315. David S. Jensen, Supriya S. Kanyal, Nitesh Madaan, Jared M. Hancock, Andrew E. Dadson, Michael A. Vail, Richard Vanfleet, V. Shutthanandan, Zihua Zhu, Mark H. Engelhard, Matthew R. Linford "Multi-instrument characterization of the surfaces and materials in microfabricated, carbon nanotube-templated thin layer chromatography plates. An analogy to 'The Blind Men and the Elephant'" *Surface and Interface Analysis* **2013**, *45(8)*, 1273–1282.
316. Anthony C. Pearson, Matthew R. Linford, John N. Harb, and Robert C. Davis "Dual Patterning of a Polyacrylic Acid Layer by Electron Beam and Block Copolymer Lithographies". *Langmuir* **2013***, 29 (24),* 7433–7438.
317. Jensen, D.S.; Kanyal, S.S.; Madaan, N.; Miles, A.J.; Davis, R.C.; Vanfleet, R.; Vail, M.A.; Dadson, A.E.; Linford, M.R. "Ozone priming of patterned carbon nanotube forests for subsequent atomic layer deposition-like deposition of SiO_2 for the preparation of microfabricated thin layer chromatography plates." J. Vac. Sci. Technol. B 31(3), May/Jun **2013** 031803-1; http://dx.doi.org/10.1116/1.4801834.
318. Supriya S. Kanyal, David S. Jensen, Andrew E. Dadson, Michael A. Vail, Richard R. Vanfleet, Robert C. Davis, Matthew R. Linford "Effects of Catalyst Thickness on the Fabrication and Performance of Carbon Nanotube-Templated Thin Layer Chromatography Plates". J. Vac. Sci. Technol. B **31**, 031203 (**2013**); http://dx.doi.org/10.1116/1.4795859.
319. Gupta, V.; Madaan, N.; Jensen, D.S.; Kunzler, S.C.; Linford, M.R. "Hydrogen Plasma Treatment of Silicon Dioxide for Improved Silane Deposition". *Langmuir* **2013**, *29*, 3604−3609.

320. Anthony C. Pearson, Sarah Jamieson, Matthew R. Linford, Barry M. Lunt, and Robert C. Davis "Oxidation of graphene 'bow tie' nanofuses for permanent, write-once-read-many data storage devices". *Nanotechnology* **2013**, *24*, 135202 (7pp).
321. Wang, H.; Lunt, B.M.; Gates, R.J.; Asplund, M.C.; Shutthanandan, V.; Davis, R.C.; Linford, M.R. 'A Carbon/Ternary Alloy/Carbon Optical Stack on Mylar as an Optical Data Storage Medium to Potentially Replace Magnetic Tape'. *ACS Appl. Mater. Interfaces* **2013***, 5 (17),* 8407–8413.
322. Chuan-Hsi Hung, Landon A. Wiest, Bhupinder Singh, Anubhav Diwan, Michael J. C. Valentim, James M. Christensen, Robert C. Davis, Andrew J. Miles, David S. Jensen, Michael A. Vail, Andrew E. Dadson, and Matthew R. Linford. 'Improved efficiency of reversed-phase carbon/nanodiamond/polymer core–shell particles for HPLC using carbonized poly(divinylbenzene) microspheres as the core materials'. *J. Sep. Sci.* **2013**, *36*, 3821–3829.

CONFERENCE PROCEEDINGS

323. Lunt, B.M.; Linford, M.R.; Davis, R.C.; Jamieson, S.; Wang, H. 'Toward Permanence in Digital Data Storage'. *Archiving 2013*, Washington, D.C., Apr. 2-6, **2013**.
324. Barry Lunt, Robert Davis, Douglas Hansen, John Dredge, Hao Wang, and Matthew Linford 'Permanent digital data storage: A materials approach' 10th International Conference on Preservation of Digital Objects (iPRES2013), 2-5 September 2013, Lisbon, Portugal.
325. Wang, H.; Diwan, A.; Lunt, B.M.; Davis, R.C.; Linford, M.R. 'XPS and SIMS Characterization of a BiTeSe Write Layer for Permanent Optical Tape Storage'. ISOM 2013, Incheon, South Korea, Aug. 18 - 22, 2013.
326. Wang, H.; Lunt, B.M.; Davis, R.C.; Linford, M.R. 'Simulation of Laser Writing to a Mylar/C/Bi-Te-Se Stack for Permanent Optical Tape Storage'. ISOM 2013, Incheon, South Korea, Aug. 18 - 22, 2013.

PATENTS

327. Buntel, C.J.; Hansen, D.P.; Linford, M.R.; Lunt, B.M.; Miller, C.M.; Perkins, R.T.; Worthington, M.O. U.S. Patent No. 8,361,585. 'Optical data storage media containing an encapsulated data layer'. January 29, 2013.
328. Allred, D.E.; Bard, E.C.; Davis, R.C.; Hansen, D.P.; Linford; M.R.; Lunt, B.M.; Worthington, M.O. U.S. Patent No. 8,389,095. 'Optical data storage media containing substantially inert low melting temperature data layer'. March 5, 2013.
329. Lunt, B.M.; Linford, M.R.; Davis, R.C.; Anderson, D. U.S. Patent No. 8,467,215. 'Permanent solid state memory' June 18, 2013.
330. Davis, R.C.; Linford, M.R.; Lunt, B.M. U.S. Patent No. 8,563,110. 'Optical data media containing an ultraviolet protection layer'. Oct. 22, 2013.
331. Linford, M.R.; Miller, C.M. U.S. Patent No. 8,563,111. 'Digital information media having adhesion promotion layer on a substrate'. Oct. 22, 2013.
332. Buntel, C.J.; Davis, R.C.; Hansen, D.P.; Linford, M.R.; Lunt, B.M. U.S. Patent No. 8,568,957. 'Data Storage Media Containing Inorganic Nanomaterial Data Layer'. Oct. 29, 2013.

PEER-REVIEWED CONTRIBUTIONS TO SPECTRAL DATABASES

333. Madaan, N.; Linford, M.R. 'Introduction to XPS Characterization of the Materials in Novel Carbon Nanotube-Based, Microfabricated, Thin Layer Chromatography Plates.' Madaan, N.; Linford, M.R. *Surface Science Spectra* **2013**, *20*, 35.
334. Jensen, D.S.; Kanyal, S.S.; Madaan, N.; Vail, M.A.; Dadson, A.E.; Engelhard, M.H.; Linford, M.R. 'Silicon (100)/SiO_2 by XPS.' *Surface Science Spectra* **2013**, *20*, 36 - 42.
335. Madaan, N.; Kanyal, S.S.; Jensen, D.S.; Vail, M.A.; Dadson, A.E.; Engelhard, M.H.; Samha, H.; Linford, M.R. 'Al_2O_3 e-Beam Evaporated onto Silicon (100)/SiO2, by XPS.' *Surface Science Spectra* **2013**, *20*, 43 – 48.
336. Madaan, N.; Kanyal, S.S.; Jensen, D.S.; Vail, M.A.; Dadson, A.E.; Engelhard, M.H.; Linford, M.R. 'Thermally Evaporated Iron (Oxide) on an Alumina Barrier Layer, by XPS." *Surface Science Spectra* **2013**, *20*, 49 – 54.
337. Madaan, N.; Kanyal, S.S.; Jensen, D.S.; Vail, M.A.; Dadson, A.E.; Engelhard, M.H.; Linford, M.R. 'Thermally Annealed Iron (Oxide) Thin Film on an Alumina Barrier Layer, by XPS.' *Surface Science Spectra* **2013**, *20*, 55 – 61.
338. Jensen, D.S.; Kanyal, S.S.; Madaan, N.; Vail, M.A.; Dadson, A.E.; Engelhard, M.H. ; Linford, M.R. 'Multiwalled Carbon Nanotube Forest Grown via Chemical Vapor Deposition from Iron Catalyst Nanoparticles, by XPS.' *Surface Science Spectra* **2013**, *20*, 62 - 67.

APPLICATION NOTES

339. Singh, B.; Kanyal, S.S.; Jensen, D.S.; Dadson, A.E.; Linford, M.R. 'Reproducibility and Stability of the Diamond Analytics Flare Mixed-Mode Column at Extremes of pH'. Diamond Analytics Application Note DA2000-A.
340. Singh, B.; Jensen, D.S.; Miles, A.J.; Dadson, A.E.; Linford, M.R. 'Probing the Retention Mechanism of the Flare Mixed-Mode Column at Low pH via Acidic Herbicides with Different pKa values'. Diamond Analytics Application Note DA1000-C.
341. Singh, B.; Jensen, D.S.; Miles, A.J.; Dadson, A.E.; Linford, M.R. 'Comparison of the Flare Mixed-Mode Column Against Commercial C_{18} and PFP Columns for the Separation of Critical Pairs of Acidic Herbicides'. Diamond Analytics Application Note DA1000-B.
342. Singh, B.; Jensen, D.S.; Miles, A.J.; Dadson, A.E.; Linford M.R. ' Flare Mixed-Mode Column: Separation of 2,4-D, MCPA and Dicamba'. Diamond Analytics Application Note DA1000-A.
343. Chuan-His Hung, A.A. Kazarian, Andrew E. Dadson, Brett Paull, Pavel N. Nesterenko, Matthew R. Linford 'Guidelines for Understanding the Retention Mechanism of Diamond Analytics Flare Mixed-Mode Column'. Diamond Analytics Application Note.
344. Chuan-Hsi Hung, A.A. Kazarian, Andrew E. Dadson, Brett Paull, Pavel N. Nesterenko, Matthew R. Linford. 'A General Tutorial on Acid-Base Chemistry as a Basis for Understanding the Diamond Analytics Flare Mixed-Mode Column'. Diamond Analytics Application Note.
345. Wiest, L.A.; Jensen, D.S.; Miles, A.J.; Dadson, A.E.; Linford, M.R. 'Flare Mixed-Mode Column: Triazine Herbicides'. Diamond Analytics Application Note DA1004-A.
346. Wiest, L.A.; Jensen, D.S.; Miles, A.J.; Dadson, A.E.; Linford, M.R. 'Flare Mixed-Mode Column: β_2-Agonists and Amphetamines'. Diamond Analytics Application Note DA1003-A.

347. Wiest, L.A.; Jensen, D.S.; Miles, A.J.; Dadson, A.E.; Linford, M.R. 'Flare Mixed-Mode Column: Eucalyptus Essential Oil'. Diamond Analytics Application Note DA1002-A.
348. Wiest, L.A.; Jensen, D.S.; Miles, A.J.; Dadson, A.E.; Linford, M.R. 'Flare Mixed-Mode Column: Lavender Essential Oil'. Diamond Analytics Application Note DA1002-B.
349. Wiest, L.A.; Jensen, D.S.; Miles, A.J.; Dadson, A.E.; Linford, M.R. 'Flare Mixed-Mode Column: Melaleuca Essential Oil'. Diamond Analytics Application Note DA1002-C.
350. Wiest, L.A.; Jensen, D.S.; Miles, A.J.; Dadson, A.E.; Linford, M.R. 'Flare Mixed-Mode Column: Peppermint Essential Oil'. Diamond Analytics Application Note DA1002-D.

2012 Publications

PEER-REVIEWED PAPERS

351. David S. Jensen, Supriya S. Kanyal, Vipul Gupta, Michael A. Vail, Andrew E. Dadson, Mark Engelhard, Richard Vanfleet, Robert C. Davis, and Matthew R. Linford. "Stable, microfabricated thin layer chromatography plates without volume distortion on patterned, carbon and Al_2O_3-primed carbon nanotube forests". *J. Chrom. A.* **2012***, 1257,* 195 – 203.
352. Ganegoda, H.; Jensen, D.S.; Olive, D.; Cheng, L.; Segre, C.U.; Linford, M.R.; Terry, J. "Photoemission studies of fluorine functionalized porous graphitic carbon". J. Appl. Phys. *111*, 053705 (**2012**); http://dx.doi.org/10.1063/1.3691888.
353. Nelson, K.A.; Linford, M.R.; Wheeler, D.R.; Harb, J.N. "Use of a plating additive to enable continuous metallization of nanoscale electrochemically patterned chemical templates." *Electrochimica Acta* **2012***, 69*, 320–327.
354. Jensen, D.S.; Teutenberg, T.; Clark, J.; Linford, M.R. "Elevated Temperatures in Liquid Chromatography, Part I: Benefits and Practical Considerations" *LCGC North America* **2012***, 30(9)*, 850 – 863.
355. Jensen, D.S.; Teutenberg, T.; Clark, J.; Linford, M.R. "Elevated Temperatures in Liquid Chromatography, Part II: Basic Thermodynamics of Elevated Temperature LC, Including the van't Hoff Relationship" *LCGC North America* **2012***, 30(11)*, 992 – 999.
356. Jensen, D.S.; Teutenberg, T.; Clark, J.; Linford, M.R. "Elevated Temperatures in Liquid Chromatography, Part III: A Closer Look at the van't Hoff Equation". *LCGC North America* **2012***, 30(12)*, 1052 – 1065.

CONFERENCE PROCEEDINGS

357. Lunt, B.M.; Davis, R.C.; Linford, M.R. "Research on Another Permanent Data Storage Solution". IS&T Archiving Conference, June 12 – 15, **2012**, Copenhagen, Denmark.
358. Lunt, B.M.; Davis, R.C.; Linford, M.R. "Family History Archives: Research on Permanent Data Storage". Proceedings of the Family History Technology Workshop. Feb. 3, **2012**, Salt Lake City, UT.
359. Lunt, B.M.; Hansen, D.; Linford, M.R. "Permanent Storage for Digital Photos". Accepted as an Invited Paper at Technology for Digital Photo Fulfillment Conference. Jan. 8 – 9, **2012**, Las Vegas, NV.

360. Pearson, A.C.; Singh, B.; Linford, M.R.; Lunt, B.M.; Davis, R.C. "Fabrication and Characterization of Nanoscale Tellurium Fuses for Long Term Solid State Data Storage", Nanotech Conference and Expo, Santa Clara, CA. June 18-21, **2012**.
361. Barry M. Lunt, Anthony Pearson, Robert Davis, Hao Wang, Sarah Jamieson, Matthew R. Linford "Towards a New Material for SS WORM Storage". International Symposium on Optical Memory (ISOM) Sept. 30 – Oct. 4, **2012**, Tokyo Japan.
362. Anthony Pearson, Bhupinder Singh, Matthew R. Linford, Barry Lunt, Robert Davis "The Effect of Geometry on Nanoscale Tellurium Fuses for Solid State Data Storage". International Symposium on Optical Memory (ISOM) Sept. 30 – Oct. 4, **2012**, Tokyo Japan.
363. Anthony Pearson, Bhupinder Singh, Matthew R. Linford, Barry Lunt, Robert Davis "Materials Study of Nanoscale Fuses for Solid State Data Storage". International Symposium on Optical Memory (ISOM) Sept. 30 – Oct. 4, **2012**, Tokyo Japan.

PATENTS

364. Linford, M.R.; Jensen, D.S.; Wiest, L.A. U.S. Patent No. 8,202,430 "Modified Diamond Particle Surfaces and Method". June 19, 2012.
365. Asplund, M.C.; Davis, R.C.; Hansen, D.P.; Linford, M.R.; Lunt, B.M.; Niederhauser, T.L.; Perkins, R.T.; Worthington, M.O. U.S. Patent No. 8,192,820 B2 "Data Storage Media Containing Carbon and Metal Layers". June 5, 2012.
366. Linford, M.R.; Yang, L.; Wiest, L.A. U.S. Patent No. 8,147,985 "Diamond Coating by Living Polymerization". April 3, 2012.
367. Linford, Matthew R.; Hung, Chuan-Hsi Canadian Patent No. CA 2,818,490 "SONICATION FOR IMPROVED PARTICLE SIZE DISTRIBUTION OF CORE-SHELL PARTICLES" May 24, 2012.

2011 Publications

PEER-REVIEWED PAPERS

368. David S. Jensen, Vipul Gupta, Rebecca E. Olsen, Alex T. Miller, Robert C. Davis, Daniel H. Ess, Zihua Zhu, Michael A. Vail, Andrew E. Dadson, Matthew R. Linford. "Functionalization/passivation of porous graphitic carbon with di-*tert*-amylperoxide." *J. Chrom. A.* **2011**, *1218*, 8362 – 8369.
369. Wiest, L.A.; Jensen, D.S.; Hung, C.-H.; Olsen, R.E.; Davis, R.C.; Vail, M.A.; Dadson, A.E.; Nesterenko, P.N.; Linford, M.R. "Pellicular Particles with Spherical Carbon Cores and Porous Nanodiamond/Polymer Shells for Reversed-Phase HPLC." *Analytical Chemistry* **2011**, *83(14)*, 5488-5501.
370. Song, J.; Jensen, D.S.; Hutchison, D.N.; Turner, B.; Wood, T.; Dadson, A.; Vail, M.A.; Linford, M.R.; Vanfleet, R.; Davis, R.C. "Carbon Nanotube-Templated Microfabrication of Porous Silicon-Carbon Materials with Application to Chemical Separations." *Advanced Functional Materials* **2011**, *21(6)*, 1132 – 1139.
371. Madaan, N.; Terry, A.; Harb, J.; Davis, R.C.; Schlaad, H.; Linford, M.R. "Functionalization of Sulfhydryl-Terminated Monolayers on Gold and Silicon Dioxide with

Polybutadiene and Post-Functionalization with Different Thiols, including DNA-SH, via Thiol-Ene Chemistry." *J. Chem. Phys. C*. **2011**, *115(46)*, 22931 – 22938.

372. Pearson, A.; Pound, E.; Woolley, A.; Linford, M.; Harb, J.; Davis, R. "Chemical Alignment of DNA Origami to Block Copolymer Patterned Arrays of 5-nm Gold Nanoparticles." *Nano Letters* **2011**, *11(5)*, 1981-1987.
373. Quast, A.; Zhang, F.; Linford, M.R.; Patterson, J.E. "Back-Surface Gold Mirrors for Vibrationally Resonant Sum-Frequency (VR-SFG) Spectroscopy Using 3-Mercaptopropyltrimethoxysilane as an Adhesion Promoter." *Applied Spectroscopy* **2011**, *65(6)*, 634-641.
374. Pei, L.; Balls, A.; Tippets, C.; Abbott, J.; Linford, M.R.; Hu, J.; Madan, A.; Allred, D.D.; Vanfleet, R.R.; Davis, R.C. "Polymer molded templates for nanostructured amorphous silicon photovoltaics". *Journal of Vacuum Science and Technology A* **2011**, *29,* 021017.
375. Pei, L.; Abbott, J.; Zufelt, K.; Davis, A.; Zappe, M.; Decker, K.; Liddiard, S.; Vanfleet, R.; Linford, M.R.; Davis, R. "Processing of Thin, Composite Carbon Nanotube-Polyimide Composite Membranes". *Nanoscience and Nanotechnology Letters* **2011**, *3(4)*, 1-7.
376. Guilin Jiang, Felipe Rivera, Supriya Singh Kanyal, Robert C. Davis, Richard Vanfleet, Barry M. Lunt, Vaitiyalingam Shutthanandan, and Matthew R. Linford "Characterization of the plastic substrates, the reflective layers, the adhesives, and the grooves of today's archival-grade recordable DVDs" *Opt. Eng.* 50, 015201 (2011), DOI:10.1117/1.3529981.

CONFERENCE PROCEEDINGS

377. Jiang, G.; Lunt, B.M.; Niederhauser, T.L.; Linford, M.R. "Optical Disc Drives: A Study of Variation." ISOM/ODS Kauai, Hawaii, 17 July - 20 July, **2011**.

PATENTS

378. Soane, D.S.; Linford, M.R. U.S. Patent No. 7,968,084 "Nanoscopic hair care products" Jun. 28, **2011**.
379. Linford, Matthew R.; Davis, Robert C.; Vanfleet, Richard; Jensen, David S.; Yang L. Canadian Patent No. CA 2,789,256 "METHOD FOR MANUFACTURING THIN LAYER CHROMATOGRAPHY PLATES" Sept. 9, **2011**.
380. Linford, Matthew R.; Davis, Robert C.; Vanfleet, Richard; Jensen, David S.; Yang L. Canadian Patent No. CA 2,764,919 "THIN LAYER CHROMATOGRAPHY PLATES AND RELATED METHODS" Jan. 6, **2011**.

2010 Publications

PEER-REVIEWED PAPERS

381. Wickard, T.D.; Nelsen, E.; Madaan, N.; ten Brummelhuis, N.; Diehl, C.; Schlaad, H.; Davis, R.C.; Linford, M.R. "Attachment of Polybutadienes to Hydrogen-Terminated Silicon and Post-Derivatization of the Adsorbed Species." *Langmuir* **2010**, *26(3),* 1923–1928.

382. Lee, M.V.; Lee, J.R.I.; Brehmer, D.E.; Linford, M.R.; Willey, T.M. "Unanticipated C=C Bonds in Covalent Monolayers on Silicon Revealed by NEXAFS." *Langmuir* **2010**, *26(3),* 1512-1515.
383. Hill, J.P.; Lee, M.V.; Yu, X.-Y.; Okamoto, K.; Linford, M.R.; Ariga, K. "Macroporous poly(aromatic amine): Synthesis and film fabrication." *Colloid Surf. A-Physicochem. Eng. Asp*. **2010**, *354*, 156-161.
384. Saini, G.; Jensen, D.S.; Wiest, L.A. Vail, M.A.; Dadson, A.; Lee, M.L.; Shutthanandan, V.; Linford, M.R. "Core-Shell Diamond as a Support for Solid-Phase Extraction and High-Performance Liquid Chromatography." *Analytical Chemistry* **2010**, *82(11),* 4448-4456.
385. Attavar, S.; Diwekar, M.; Linford, M.R.; Davis, M.A.; Blair, S. "Passivation of aluminum with alkyl phosphonic acids for biochip applications". *Applied Surface Science* **2010**, *256,* 7146 -7150.
386. Abbott, J.; Niederhauser, T.L.; Hansen, D.P.; Perkins, R.T.; Bell, D.A.; Bard, E.C.; Lunt, B.M.; Worthington, M.O.; Miller, C.M.; Hyatt, D.F.; Asplund, M.C.; Jiang, G.; Linford, M.R.*; Vanfleet, R.R.*; Davis, R.C.* "Carbon Coated Tellurium for Optical Data Storage". *ACS Applied Materials and Interfaces* **2010**, *2(8),* 2373 -2376.
387. Zhang, F.; Sautter, K.; Larsen, A.M.; Findley, D.A.; Davis, R.C.; Samha, H.; Linford, M.R. "Chemical Vapor Deposition of Three Aminosilanes on Silicon Dioxide: Surface Characterization, Stability, Effects of Silane Concentration, and Cyanine Dye Adsorption". *Langmuir* **2010**, *26 (18)*, 14648–14654.
388. Yang, L.; Jensen, D.S.; Vail, M.A.; Dadson, A.; Linford, M.R. "Direct modification of hydrogen/deuterium-terminated diamond particles with polymers to form reversed and strong cation exchange solid phase extraction sorbents." *J. Chrom. A* **2010**, *1217*, 7621-7629.

CONFERENCE PROCEEDINGS

389. Guilin Jiang, Felipe Rivera, Supriya S. Kanyal, Robert C. Davis, Richard Vanfleet, Barry M. Lunt, Matthew R. Linford "Analysis of the plastic substrates, the reflective layers, and the adhesives of today's archival-grade DVDs." *Proc. SPIE* 7730, 77301N (2010).
390. Linford, M.R.; Copeland, S.; Dadson, A.; Davis, R.C.; Jensen, D.; Saini, G.; Shutthanandan, V.; Song, J.; Vail, M.A.; Vanfleet, R.; Wiest, L.A.; Wyman, R.D.; Yang, L. "The Blind Men and the Elephant as a Metaphor for Surface Analysis, as Applied to the Preparation and Analysis of New, Highly Stable Materials for Separations Science." *Extended abstract to Microscopy and Microanalysis, Portland, OR, Aug. 1 – 5, 2010*.
391. Madaan, N.; Terry, A.; Davis, R.C.; Schlaad, H.; Linford, M.R. "Chemically Stable High Resolution Surface Patterning by Thiolated DNA for Self Assembly of Nanocircuits on Gold Nano-Dot Surface." *Extended abstract to Microscopy and Microanalysis, Portland, OR, Aug. 1 – 5, 2010*.
392. Jiang, G.; Jensen, D.S.; Asplund, M.C.; Hansen, D.P.; Davis, R.C.; Lunt, B.M.; Linford, M.R. "Chemical Analysis of the Dyes in Today's Archival- and Standard-Grade DVDs" *Proceedings (Technical Digest) of ISOM 2010, Hualien, Taiwan, Oct. 24 – 28, 2010. pgs. 64 – 65*.

PATENTS

393. Linford, Matthew Richard; Wiest, Landon Andrew; Jensen, David Scott Canadian Patent No. CA 2,742,518 "MODIFIED DIAMOND PARTICLE SURFACES AND METHOD" Mar. 18, **2010**.
394. Linford, Matthew R.; Jensen, D.; Yang, L.; Wiest, L. Canadian Patent No. CA 2,737,638 "FUNCTIONALIZED GRAPHITIC STATIONARY PHASE AND METHODS FOR MAKING AND USING SAME" Mar. 25, **2010**.

PEER-REVIEWED CONTRIBUTIONS TO SPECTRAL DATABASES

395. Lee, M.V.; Husseini, G.A.; Sautter, K.; Linford, M.R. "Gas phase deposition of trichloro(1H,1H,2H,2H-perfluorooctyl)silane on silicon dioxide." *Surface Science Spectra* **2010**, *17*, 87 - 92. (Note, this document was published in 2012.)
396. Pei, L.; Jiang, G.; Baxter, L.L.; Linford, M.R. "Analysis of Coal by Static Time-of-Flight Secondary Ion Mass Spectrometry (TOF-SIMS)." *Surface Science Spectra* **2010**, *17,* 1-67. (This paper was highlighted on the cover of the journal. Note, this document was published in 2011.)

2009 Publications

PEER-REVIEWED PAPERS

397. Yang, Li; Vail, Michael A.; Dadson, Andrew; Lee, Milton, L.; Asplund, Matthew C.; Linford, Matthew R. "Functionalization of Deuterium- and Hydrogen-Terminated Diamond Particles with Mono- and Multilayers of Di-tert-amyl Peroxide and Their Use in Solid Phase Extraction." *Chemistry of Materials* **2009**, *21*, 4359-4365.
398. Shirahata, N.; Linford, M.R.; Furumi, S.; Pei, L.; Sakka, Y.; Gates, R.J.; Asplund, M.C.; "Laser-derived one-pot synthesis of silicon nanocrystals terminated with organic monolayers." *Chemical Communications* **2009**, 4684-4686.
399. Saini, G.; Gates, R.; Asplund, M.C.; Blair, S.; Attavar, S.; Linford, M.R. "Directing polyallylamine adsorption on microlens array patterned silicon for microarray fabrication." *Lab on a Chip* **2009**, *9*, 1789-1796.
400. Yang, L.; Shirahata, N.; Saini, G.; Zhang, F.; Pei, L.; Asplund, M.C.; Kurth, D.; Ariga, K.; Sautter, K.; Nakanishi, T.; Smentkowski, V.; Linford, M.R. "Effect of Surface Free Energy on PDMS Transfer in Microcontact Printing and Its Application to ToF-SIMS to Probe Surface Energies." *Langmuir* **2009**, *25(10)*, 5674-5683.
401. Saini, G.; Wiest, L.A.; Herbert, D.; Biggs, K.N.; Dadson, A.; Vail, M.A.; Linford, M.R. "C_{18}, C_8, and perfluoro reversed phases on diamond for solid-phase extraction." *J. Chrom. A*. **2009**, *1216*, 3587–3593.
402. Zhang, F.; Sautter, K.; Davis, R.; Linford, M.R. "Subsurface Oxidation for Micropatterning Silicon (SOMS)." *Langmuir* **2009**, *25(3),* 1289–1291.
403. Yang, L.; Bennett, R.; Strum, J.; Ellsworth, B.B.; Hamilton, D.; Tomlinson, M.; Wolf, R.W.; Housley, M.; Roberts, B.A.; Welsh, J.; Banka, C.; Tulin, C.D.; Linford, M.R. "Screening phosphatidylcholine biomarkers in mouse liver extracts from a

hypercholesterolemia study using ESI-MS and chemometrics." *Analytical and Bioanalytical Chemistry* **2009**, *393,* 643-654.

404. Lunt, B.M.; Buntel, C.J.; Linford, M.R. "Embrittlement of Polycarbonate Optical Discs." *Journal of Advanced Materials* **2009**, *41(4)*, 22 – 27. This paper was highlighted on the cover of the journal.

CONFERENCE PROCEEDINGS

405. Lunt, B.M.; Linford, M.R. "Towards a True Archival-Quality Optical Disc." Proceedings of International Symposium on Optical Memory (ISOM), pp. 88 – 89, October 4 - 8, **2009**, Nagasaki, Japan.

406. Lunt, B.M.; Linford, M.R. "Predicting the Reliability of Data on DVD-R Discs." Proceedings of ODS 2009 (Optical Data Storage), Lake Buena Vista, FL, May 10-13, **2009**, proceedings on CD-ROM (no page numbers).

PATENTS

407. Lunt, B.M.; Linford, M.R. U.S. Patent No. 7,613,869 "Long-Term Digital Data Storage" Nov. 3, **2009**.

2008 Publications

PEER-REVIEWED PAPERS

408. Saini, G.; Yang, L.; Lee, M.L.; Dadson, A.; Vail, M.A.; Linford, M.R. "Amino-Modified Diamond as a Durable Stationary Phase for Solid-Phase Extraction." *Analytical Chemistry* **2008**; *80*, 6253-6259.

409. Blake, R.B.; Pei, L.; Lee, M.V.; Davis, R.C.; Shirahata, N.; Linford, M.R. "One-Step Growth of ca. 2 – 15 nm Polymer Thin Films on Hydrogen-Terminated Silicon." *Macromolecular Rapid Communications* **2008**, *29*, 638 – 644. (This paper was highlighted on the cover of the journal.

410. Saini, G.; Sautter, K.; Hild, F.E.; Pauley, J.; Linford, M.R. "Two-silane chemical vapor deposition treatment of polymer (nylon) and oxide surfaces that yields hydrophobic (and superhydrophobic), abrasion-resistant thin films." *Journal of Vacuum Science and Technology A* **2008**, *26(5),* 1224-1234.

411. Pei, L.; Jiang, G.; Tyler, B.J.; Baxter, L.L.; Linford, M.R. "Time-of-Flight Secondary Ion Mass Spectrometry of a Range of Coal Samples: A Chemometrics (PCA, Cluster, and PLS) Analysis." *Energy & Fuels* **2008**, *22*, 1059 - 1072.

412. Strein, E.; Allred, D.; Linford, M.R. "Use of a commercial RF plasma cleaner in eliminating adventitious carbon contamination in an XPS system". *Microscopy and Microanaysis* **2008**, 818 - 819. doi.org/10.1017/S1431927608087710

BOOK CHAPTERS

413. Savage, P.B.; Nielsen, J.; Lai, X.-Z.; Feng, Y.; Yang Li; Nelson, G.; Linford, M.R.; Genberg, C. "Antibacterial Activities of Thin Film Containing Ceragenins", pgs. 65 – 78, in ACS SYMPOSIUM SERIES 984, Microbial Surfaces: Structure, Interactions, and Reactivity. Ed. by T.A. Camesano and C.M. Mello, Sponsored by the ACS Division of Colloid and Surface Chemistry, **2008**.

CONFERENCE PROCEEDINGS

414. Liu, J.; Becerril, H.A.; Lee, M.V.; Nelson, K.A.; Bird, E.; Hutchins, L.; Conley, H.; Wheeler, D.R.; Davis, R.C.; Woolley, A.T.; Linford, M.R.; Harb, J.N. "Chemically Directed Surface Alignment and Wiring of Self-Assembled Nanoelectrical Circuits" **2008** FNANO Proceedings.
415. Lunt, B.M.; Hyatt, D.; Zhang, F.; Saini, G.; Linford, M.R. "Preserving Our Digital Heritage." Proceedings of the ICCE (International Conference on Consumer Electronics), Jan 9-13, **2008**.

PATENTS

416. Soane, D.S.; Millward, D.B.; Linford, M.R.; Lau, R.; Green, E.G.; Ware, Jr., W. U.S. Patent No. 7,427,300 "Hydrophilic finish for fibrous substrates" September 23, **2008**.
417. Linford, Matthew; Saini, Gaurav Canadian Patent No. CA 2,664,536 "HYDROPHOBIC AND OLEOPHOBIC COATING AND METHOD FOR PREPARING THE SAME" April 10, **2008**.

2007 Publications

PEER-REVIEWED PAPERS

418. Zhang, F.; Gates, R. J.; Smentkowski, V. S.; Natarajan, S.; Gale, B. K.; Watt, R. K.; Asplund, M. C.; Linford, M. R. "Direct Adsorption and Detection of Proteins, Including Ferritin, onto Microlens Array Patterned Bioarrays." *J. Am. Chem. Soc.* **2007**, *129(30)*; 9252-9253.
419. Arafat, A.; Giesbers, M.; Rosso, M.; Sudholter, E. J. R.; Schroen, K.; White, R. G.; Yang, L.; Linford, M. R.; Zuilhof, H. "Covalent Biofunctionalization of Silicon Nitride Surfaces." *Langmuir* **2007**, *23(11)*, 6233-6244.
420. Lee, M.V.; Nelson, K.A.; Hutchins, L.; Becerril, H.A.; Cosby, S.T.; Blood, J.C.; Wheeler, D.R.; Davis, R.C.; Woolley, A.T.; Harb, J.N.; Linford, M.R. "Nanografting of Silanes on Silicon Dioxide with Applications to DNA Localization and Copper Electroless Deposition." *Chemistry of Materials* **2007**, *19*, 5052-5054.
421. Yang, L.; Lua, Y.-Y.; Tan, M.; Sherman, O.A.; Grubbs, R.H.; Harb, J.N.; Davis, R.C.; Linford, M.R. "Chemistry of Olefin-Terminated Homogeneous and Mixed Monolayers on Scribed Silicon." *Chemistry of Materials* **2007**, *19*, 1671 – 1678.

422. Pei. L.; Jiang, G.; Davis, R.C.; Shaver, J.M.; Smentkowski, V.S.; Asplund, M.C.; Linford, M.R. "Laser Activation-Modification of Semiconductor Surfaces (LAMSS) of 1-Alkenes on Silicon: A ToF-SIMS, Chemometrics, and AFM Analysis." *Applied Surface Science* **2007**, *253 (12)*, 5375-5386.

CONFERENCE PROCEEDINGS

423. Lunt, B.M.; Sydenham, R.; Zhang, F.; Linford, M.R. "Digital Data Preservation: The Millennium CD and Graceful Degradation." Proceedings of the 7th Annual Workshop on Technology for Family History and Genealogical Research, 2007, Provo, UT, March **2007**.

2006 Publications

PEER-REVIEWED PAPERS

424. Zhang, F.; Pei, L.; Bennion, E.; Jiang, G.; Connley, D.; Yang, L.; Lee, M.V.; Davis, R.C.; Strossman, G.; Linford, M.R.; Asplund, M.C. "Laser Activation-Modification of Semiconductor Surfaces (LAMSS)." *Langmuir* **2006**, *22(26)*, 10859-10863.
425. Lee, M.V.; Richards, J.; Linford, M.R.;* Casey, S.* "Gas phase chemomechanical modification of silicon." *J.Vac.Sci.Tech.B.* **2006**, *24*(2); 750-755.
426. Zhang, F.; Halverson, P.; Lunt, B.; Linford, M.R. "Wet Spinning of Predoped Polyaniline into an Aqueous Solution of a Polyelectrolyte." *Synthetic Metals* **2006**, *156 (14-15)*; 932-937. (A figure from this paper appeared on the cover of the issue it appeared in.)
427. Parent, A.A.; Anderson, T.M.; Michaelis, D.J.; Jiang, G.; Savage, P.B.; Linford, M.R. "Direct ToF-SIMS Analysis of Organic Halides and Amines on TLC Plates." *Applied Surface Science* **2006**, *252*; 6746–6749.
428. Lee, M.V. Hoffman, M.T.; Barnett, K.; Geiss, J.-M.; Smentkowski, V.S.; Linford, M.R.;* Davis, R.C.* "Chemomechanical Nanolithography: Nanografting on Silicon and Factors Impacting Linewidth." *J. Nanosci. Nanotechnol.* **2006**; *6*; 1639–1643. This paper was also written up as GE Global Research Technical Report number: 2006GRC662.

CONFERENCE PROCEEDINGS

429. Nelson, K.A.; Cosby, S.T.; Blood, J.C.; Lee, M.V.; Wheeler, D.R.; Davis, R.C.; Woolley, A.T.; Linford, M.R.; Harb, J.N. "Substrate Preparation for Nanowire Fabrication by Selective Metallization of Patterned Silane Monolayers." ECS Trans. 1, Issue 12, 17-23, **2006**.

2005 Publications

PEER-REVIEWED PAPERS

430. Bronson, R.T.; Michaelis, D.J.; Lamb, R.D.; Husseini, G.A.; Farnsworth, P.B.; Linford, M.R.; Izatt, R.M.; Bradshaw, J.S.; Savage, P.B. "Efficient Immobilization of a Cadmium

Chemosensor in a Thin Film: Generation of a Cadmium Sensor Prototype." *Org. Lett.* **2005**, *7*(6), 1105-1108.

431. Yang, L.; Lua, Y.-Y.; Lee, M.V.; Linford, M.R. "Simultaneous Functionalization and Patterning of Silicon by Scribing. Chemomechanical Surface Modification." *Accounts of Chemical Research* **2005**, 38(12) 933-942.
432. Yang, L., Lua, Y.-Y.; Jiang, G.; Tyler, B.J.; Linford, M.R. "Multivariate Analysis of TOF-SIMS Spectra of Monolayers on Scribed Silicon." *Analytical Chemistry* **2005**, *77*(14); 4654-4661.
433. Lua, Y.-Y.; Fillmore, W. J. J.; Yang, L.; Lee, M. V.; Savage, P. B.; Asplund, M. C.; Linford, M. R. "First Reaction of a Bare Silicon Surface with Acid Chlorides and a One-Step Preparation of Acid Chloride Terminated Monolayers on Scribed Silicon." *Langmuir* **2005**, *21(6)*, 2093-2097. This paper was highlighted in C&E News, March 21, **2005** pg 10.
434. Lua, Y.-Y.; Yang, L.; Pew, C.A.; Zhang, F.; Fillmore, W.J.J.; Bronson, R.T.; Sathyapalan, A.; Savage, P.B.; Whittaker, J.D.; Davis, R.C.; Linford, M. R. "Polyelectrolytes as New Matrices for Secondary Ion Mass Spectrometry." *J. Am. Soc. Mass Spec.* **2005**, *16*, 1575-1582.
435. Cannon, B.R.; Lillian, T.D.; Howell, L.L.; Magleby, S.P.; Niederhauser, T.L.; Linford, M.R. "A Compliant End-effector for Microscribing." *Precision Engineering* **2005**, *29(1)*, 86-94.

BOOK CHAPTERS

436. Linford, M.; Davis, R.; Magleby, S.; Howell, L.; Jiang, G.; Thulin, C. Invited Book Chapter: "Chemomechanical surface modification of materials for patterning" in Nano-lithography and Patterning Techniques in Microelectronics." Ed. by D.G. Bucknall *Woodhead Publishing*, **2005**.

PATENTS

437. Linford; M.R.; Soane; D.S.; Offord; D.A.; Ware, W., Jr. U.S. Patent No. 6,872,424 "Durable finishes for textiles" March 29, **2005**.
438. Linford, M.R.; Soane, D.S.; Offord, D.A. U.S. Patent No. 6,855,772 "Water-repellent and soil-resistant finish for textiles" February 15, **2005**.

2004 Publications

PEER-REVIEWED PAPERS

439. Lee, M.V.; Guo, D.; Linford, M.R.*; Zuilhof, H.* "Molecular Modeling of Alkyl Monolayers on the Si(100)-2x1 Surface." *Langmuir* **2004**, *20*, 9108-9113.
440. Lua, Y.-Y.; Fillmore, W.J.J.; Linford, M.R. "Aldehydes React with Scribed Silicon to form Alkyl Monolayers. Characterization by ToF-SIMS Suggests and Even-Odd Effect." *Applied Surface Science* **2004**, *231-232*, 324-328. (Special Issue: Proceedings of the Fourteenth International Conference on Secondary Ion Mass Spectrometry and Related Topics, Edited by A. Benninghoven, J.L. Hunter, Jr., B.W. Schueler, H.E. Smith, and H.W. Werner.)

441. Jiang, G.; Niederhauser, T.L.; Fleming, S.A.; Asplund, M.C.; Linford, M.R. "Evidence for a Radical Mechanism in Monolayer Formation on Silicon Ground (or Scribed) in the Presence of Alkyl Halides." *Langmuir* **2004**, *20*, 1772-1774.
442. Owen, J.I.; Niederhauser, T.L.; Davis, R.C.; Linford, M.R. "Automated, Controlled Deposition of Nanoparticles on Polyelectrolyte Coated Silicon from Chemomechanically Patterned Droplet Arrays." *Lab on a Chip* **2004**, *4(6)*, 553-557**.**
443. Zilch, L.W.; Husseini, G.A.; Lua, Y.-Y.; Lee, M.V.; Gertsch, K.R.; Cannon, B.R.; Perry, R.M.; Sevy, E.T.; Asplund, M.C.; Woolley, A.T.; Linford, M.R. "Rapid and convenient method for preparing masters for microcontact printing with 1-12 μm features." *Rev. Sci. Instr.* **2004**, *75*, 3065-3067.

PATENTS

444. Soane, D.S.; Linford, M.R. U.S. Patent No. 6,821,509 "Nanoscopic hair care products" November 23, **2004**.
445. Ware, W., Jr.; Soane, D.S.; Millward, D.B.; Linford, M.R. U.S. Patent No. 6,679,924 "Dye Fixative" January 20, **2004**.

PEER-REVIEWED CONTRIBUTIONS TO SPECTRAL DATABASES

446. Jiang, G.; Husseini, G.A.; Baxter, L.L.; Linford, M.R. "Analysis of Straw by X-ray Photoelectron Spectroscopy." *Surface Science Spectra* **2004**, *11*, 91-96. (Note, this document was published in 2005.)
447. Jiang, G.; Husseini, G.A.; Baxter, L.L.; Linford, M.R. "Analysis of Grain Screening by X-ray Photoelectron Spectroscopy." *Surface Science Spectra* **2004**, *11*, 97-104. (Note, this document was published in 2005.)
448. Jiang, G.; Husseini, G.A.; Baxter, L.L.; Linford, M.R. "Analysis of Sugar Beet Pulp by X-ray Photoelectron Spectroscopy." *Surface Science Spectra* **2004**, *11*, 105-111. (Note, this document was published in 2005.)
449. Jiang, G.; Husseini, G.A.; Baxter, L.L.; Linford, M.R. "Analysis of Sheanut Shells by X-ray Photoelectron Spectroscopy." *Surface Science Spectra* **2004**, *11*, 112-118. (Note, this document was published in 2005.)
450. Jiang, G.; Husseini, G.A.; Baxter, L.L.; Linford, M.R. "Analysis of Sunflower Shells by X-ray Photoelectron Spectroscopy." *Surface Science Spectra* **2004**, *11*, 119-126. (Note, this document was published in 2005.)
451. Jiang, G.; Husseini, G.A.; Baxter, L.L.; Linford, M.R. "Analysis of Sawdust by X-ray Photoelectron Spectroscopy." *Surface Science Spectra* **2004**, *11*, 127-134. (Note, this document was published in 2005.)

2003 Publications

PEER-REVIEWED PAPERS

452. Smalley, J.F.; Finklea, H.O.; Chidsey, C.E.D.; Linford, M.R.; Creager, S.E.; Ferraris, J.P.; Chalfant, K.; Zawodzinsk, T.; Feldberg, S.W.; Newton, M.D. "Heterogeneous Electron-

Transfer Kinetics for Ruthenium and Ferrocene Redox Moieties through Alkanethiol Monolayers on Gold." *J. Am. Chem. Soc* **2003**, *125(7)*, 2004-2013.

453. Wacaser, B.A.; Maughan, M.J.; Mowat, I.A.; Niederhauser, T.L.; Linford, M.R.; Davis, R.C. "Chemomechanical surface patterning and functionalization of silicon surfaces using an atomic force microscope." *Applied Physics Letters* **2003**, *82(5)*, 808-810. (A figure from this paper appeared in the review: "Scanning Probe Lithography Using Self-Assembled Monolayers" *Chem. Rev.* **2003**, *103(11)*, 4367-4418.)
454. Lua, Y.-Y.; Niederhauser, T.L.; Wacaser, B.A.; Mowat, I.A.; Woolley, A.T.; Davis, R.C.; Fishman, H.A.; Linford, M.R. Chemomechanical Production of Sub-μm Edge Width, Functionalized ~20 μm Features on Silicon. *Langmuir* **2003**, *19(4)*, 985-988. (This communication was highlighted on the cover of Langmuir in February, 2003.)
455. Lua, Y.-Y.; Lee, M.V.; Fillmore, W.J.J.; Matheson, R.; Sathyapalan, A.; Asplund, M.C.; Fleming, S.A.; Linford, M.R. "Amine-Reactive Monolayers on Scribed Silicon with Controlled Levels of Functionality: The Reaction of Scribed Silicon with Mono- and Diepoxides." *Angew. Chem. Int. Ed.* **2003**, *42*, 4046-4049.
456. Jiang, G.; Niederhauser, T.L.; Davis, S.D.; Lua, Y.-Y.; Cannon, B.R.; Dorff, M.J.; Howell, L.L.; Magleby, S.P.; Linford, M.R. "Stability of Alkyl Monolayers on Chemomechanically Scribed Silicon to Air, Water, Hot Acid, and X-rays." *Colloids and Surfaces A* **2003**, *226*, 9-16.
457. Husseini, G.A.; Peacock, J.G.; Sathyapalan, A.; Zilch, L.W.; Asplund, M.C.; Sevy, E.T.; Linford, M.R. "Alkyl Monolayers on Silica Surfaces Prepared using Neat, Heated, Dimethylmonochlorosilanes with Low Vapor Pressures." *Langmuir* **2003**, *19(12)*, 5169-5171**.**
458. Husseini, G.A.; Peacock, J.G.; Niederhauser, T.L.; Vernon, M.R.; Asplund, M.C.; Sevy, E.T.; Linford, M.R. "Photochemical Lithography: Creation of Patterned, Acid Chloride Functionalized Surfaces using UV Light and Gas-Phase Oxalyl Chloride." *Langmuir* **2003**, *19(11)*, 4856-4858.
459. Whittaker, J.; Husseini, G.; Linford, M.R.; Davis, R.C. "Self-Aligned Mechanical Attachment of Carbon Nanotubes to Silicon Dioxide Structures by Selective Silicon Dioxide Chemical Vapor Deposition." *Applied Physics Letters* **2003**, *83(25)*, 5307-5309.

CONFERENCE PROCEEDINGS

460. Peacock, J.G.; Linford, M.R. "A Novel Method for the Preparation of Sulfhydryl-Terminated Self-Assembled Monolayers on Gold." *Proceedings of the National Conference on Undergraduate Research (NCUR)*, University of Utah, Salt Lake City, UT, March 13-15, **2003**.

PATENTS

461. Offord, D.A.; Soane, D.S.; Ware, W., Jr.; Linford, M.R. U.S. Patent No. 6,617,268 "Method for Protecting Cotton from Enzymatic Attack by Cellulase Enzymes" September 9, **2003**.
462. Soane, D.S.; Offord, D.A.; Linford, M.R.; Millward, D.B.; Ware, W., Jr.; Erskine, L.; Green, E.; Lau, R. U.S. Patent No. 6,607,994 "Nanoparticle-Based Permanent Treatments for Textiles" August 19, **2003**.

463. Linford, M.R.; Soane, D.S.; Offord, D.A. U.S. Patent No. 6,544,594 "Water-Repellent and Soil-Resistant Finish for Textiles" April 8, **2003**.
464. Soane, D.S.; Linford, M.R.; Offord, D.A.; Millward, D.B.; Ware, W., Jr. U.S. Patent No. 6,517,933 "Hybrid Polymer Materials" Feb. 11, **2003**.

2002 Publications

PEER-REVIEWED PAPERS

465. Niederhauser, T.L.; Lua, Y.-Y.; Sun, Y.; Jiang, G.; Strossman, G.S.; Pianetta, P.; Linford, M.R. "Formation of (Functionalized) Monolayers and Simultaneous Surface Patterning by Scribing Silicon in the Presence of Alkyl Halides." *Chemistry of Materials* **2002**, *14*, 27-29.
466. Linford, M.R.; Chidsey, C.E.D. "Surface Functionalization of Alkyl Monolayers by Free-Radical Activation: Gas-Phase Photochlorination with Cl_2." *Langmuir* **2002**, *18(16)*, 6217-6221.
467. Niederhauser, T.L.; Lua, Y.-Y.; Jiang, G.; Davis, S.D.; Matheson, R.; Hess, D.A.; Mowat, I.A.; Linford, M.R. "Arrays of Chemomechanically Patterned Patches of Homogeneous and Mixed Monolayers of 1-Alkenes and Alcohols on Single Silicon Surfaces." *Angew. Chem. Int. Ed.* **2002**, *41(13)*, 2353-2356.
468. Lua, Y.-Y.; Niederhauser; T.L.; Matheson, R.; Bristol, C.; Mowat, I.A.; Asplund, M.C.; Linford, M.R. "Static Time-of-Flight Secondary Ion Mass Spectrometry of Monolayers on Scribed Silicon derived from 1-Alkenes, 1-Alkynes and 1-Haloalkanes." *Langmuir* **2002**, *18*, 4840-4846.

CONFERENCE PROCEEDINGS

469. Cannon, B.R.; Magleby, S.P.; Howell, L.L.; Jiang, G.; Niederhauser, T.L.; Linford, M.R. "Influence of the Scribe Speed and Force on Chemomechanical Nanofunctionalized Features." *Proceedings of the 2002 ASME International Mechanical Engineering Congress and Exposition*, November 17-22, **2002**, New Orleans, LA**.**

PATENTS

470. Ware, W. Jr.; Soane, D.; Millward, D.B.; Linford, M.R. U.S. Patent No. 6,497,733 "Dye fixatives" Dec. 24, **2002**.
471. Soane, D.; Linford, M.R.; Lau, R.; Green, E. U.S. Patent No. 6,497,732 "Fiber-reactive polymeric dyes" Dec. 24, **2002**.

PEER-REVIEWED CONTRIBUTIONS TO SPECTRAL DATABASES

472. Thomson, J.; Stoker, J.; Bunker, J.; Agbonkonkon, N.; Iyer, G.; Bronson, R. T.; Savage, P.B.; Linford, M.R.; Husseini, G.A. "Analysis of 5-chloro-8-methoxy-2-(bromomethyl)quinoline by XPS." *Surface Science Spectra* **2002** (but published in **2004**), *9(4)*, 241-249.

473. Radicic, N.; Becerril-Garcia, H.; Myrer, A.; Cory, E.; Gertsch, K.R.; Bronson, R.T.; Savage, P.B.; Linford, M.R.; Husseini, G.A. Analysis of 10,16-Diaza-1,4,7,13-tetrathiacyclooctane-9,17-dione by XPS. *Surface Science Spectra* **2002** (but published in **2004**), *9(4)*, 234-240.
474. Hoggard, J.; Carlson, E.D.; Fredrickson, S. H.; Monson, C. F.; Gertsch, K.R.; Bronson, R. T.; Savage, P.B.; Linford, M.R.; Husseini, G.A. "Analysis of 7,13-bis((8-hydroxy-2 –quin - linyl)methyl)-1,4-dimethyl-1,4,7,13-Tetraaza-10-thiacyclopentadecane by XPS." *Surface Science Spectra* **2002** (but published in **2004**), *9(4)*, 227-233.
475. Husseini, G.A.; Sevy, E.T.; Asplund, M.C.; Peacock, J.G.; Linford, M.R. "XPS of Alkyl Monolayers on Silica Surfaces Prepared from Neat, Heated (Tridecafluoro-1,1,2,2-tetrahydroocytyl)-1-dimethylchlorosilane under Ambient Conditions." *Surface Science Spectra* **2002** (but published in **2004**), *9(4)*, 260-265.

2001 Publications

PEER-REVIEWED PAPERS

476. Niederhauser, T.L.; Jiang, G.; Lua, Y.-Y.; Dorff, M.; Woolley, A.T.; Asplund, M.C.; Berges, D.A.; Linford, M.R. "A New Method of Preparing Monolayers on Silicon and Patterning Silicon Surfaces by Scribing in the Presence of Reactive Species." *Langmuir* **2001**, *17*, 5889-5900. (A figure from this paper appeared in the review: "Organometallic Chemistry on Silicon and Germanium Surfaces" *Chem. Rev.* **2002**, *102(5)*, 1271-1308.)

PEER-REVIEWED CONTRIBUTIONS TO SPECTRAL DATABASES

477. Husseini, G.A.; Linford, M.R.; Asplund, M.C.; Peacock, J.; Sevy, E. "XPS of Alkyl Monolayers on Silica Surfaces Prepared from Neat, Heated 3-Glycidoxypropyldimethylethoxysilane under Ambient Conditions." *Surface Science Spectra* **2001**, *8(4)*, 291-296. (Note, this document was published in 2003.)
478. Husseini, G.A.; Sathyapalan, A.; Sevy, E.; Linford, M.R.; Asplund, M.C. "XPS of Alkyl Monolayers on Silica Surfaces Prepared from Neat, Heated $ClSi(CH_3)_2CH=CH_2$ under Ambient Conditions." *Surface Science Spectra* **2001**, *8(4)*, 284-290. (Note, this document was published in 2003.)
479. Husseini, G.A.; Zilch, L.; Sevy, E.; Asplund, M.C.; Linford, M.R. "XPS of Alkyl Monolayers on Silica Surfaces Prepared from Neat, Heated $ClSi(CH_3)_2(CH_2)_{17}CH_3$ under Ambient Conditions." *Surface Science Spectra* **2001**, *8(4)*, 274-283. (Note, this document was published in 2003.)

PATENTS

480. Soane, D.S.; Linford, M.R. Canadian Patent No. CA 2,405,735 "NANOSCOPIC HAIR CARE PRODUCTS" Oct. 25, **2001**.

ARTICLES ON OTHER SUBJECTS

481. Linford, M.R. *The Collegiate Post, BYU's Academic Fortnightly* **2001**, Vol. 1, Issue 10, p. 7. "Preparing for a Brutal Job Interview."

2000 Publications

PEER-REVIEWED PAPERS

482. Cicero, R.L.; Linford, M.R.; Chidsey, C.E.D. Photoreactivity of Unsaturated Compounds with Hydrogen-Terminated Silicon. *Langmuir* **2000**, *16(13)*, 5688-5695.

PATENTS

483. Linford, M.R. U.S. Patent No. 6,132,801: "Producing Coated Particles by Grinding in the Presence of Reactive Species" Oct. 17, **2000**.

1999 Publications

PEER-REVIEWED PAPERS

484. Terry, J.; Linford, M.R.; Wigren, C.; Cao, R.Y.; Pianetta, P.; Chidsey, C.E.D. "Alkyl-teriminated Si(111) surfaces: A high resolution, core level photoelectron spectroscopy study." *J. Applied Physics* **1999**, *85*, 213-221.

1998 Publications

PEER-REVIEWED PAPERS

485. Sieval, A.B.; Demirel, A.L.; Nissink, J.W.M.; Linford, M.R.; van der Maas, J.H.; de Jeu, W.H.; Zuilhof, H.; Sudhoelter, E.J.R. "Highly Stable Si-C Linked Functionalized Monolayers on the Silicon (100) Surface." *Langmuir* **1998**, *14(7)*, 1759-1768.

486. Schütte, M.; Kurth, D.G.; Linford, M.R.; Cölfen, H.; Möhwald, H. "Metallosupramolecular Thin Polyelectrolyte Films." *Angew. Chem. Int. Ed.* **1998**, *37(20)*, 2891-2893.

487. Linford, M.R.; Auch, M.; Möhwald, H. "The Non-Monotonic Effect of Ionic Strength on Surface Dye Extraction during Dye-Polyelectrolyte Multilayer Formation." *J. Am. Chem. Soc.* **1998**, *120(1)*, 178-182.

1997 Publications

PEER-REVIEWED PAPERS

488. Terry, J.; Linford, M.R.; Wigren, C.; Cao, R.-Y.; Pianetta, P.; Chidsey, C.E.D. "Determination of the Bonding of Alkyl Monolayers to the Si(111) Surface Using Chemical-Shift, Scanned-Energy Photoelectron Diffraction." *Appl. Phys. Lett.* **1997**, *71 (8)*, 1056-1058.
489. Wagner, P.; Nock, S.; Spudich, J.A.; Volkmuth, W.D.; Chu, S.; Cicero, R.L.; Wade, C.P.; Linford, M.R.; Chidsey, C.E.D. Bioreactive Self-Assembled Monolayers on Hydrogen-Passivated Si(111) as a New Class of Atomically Flat Substrates for Biological Scanning Probe Microscopy. *Journal of Structural Biology*. **1997**, 119 (2), 189-201.
490. Terry, J.; Mo, R.; Wigren, C., Cao, R.; Mount, G.; Pianetta, P.; Linford, M.R.; Chidsey, C.E.D. "Reactivity of the H-Si(111) surface." *Nucl. Instrum. Methods Phys. Res., Sect. B* **1997**, *133(1-4)*, 94-101.
491. Cicero, R.L.; Wagner, P.; Linford, M.R.; Hawker, C.J.; Waymouth, R.M.; Chidsey, C.E.D. "Functionalization of Alkyl Monolayers on Surfaces with Diverse Amines: Photochemical Chlorosulfonation Followed by Sulfonamide Formation." *Polymer Preprints* **1997**, *38*, 904-905.
492. Linford, M.R.; Möhwald, H. "A Matrix Representation of Solution Mixing by Aliquot Exchange." *Analytical Chemistry* **1997**, *69 (21)*, 4495-4497.

CONFERENCE PROCEEDINGS

493. Wade, C.P.; Luo, H.; Dunbar, W.L.; Linford, M.R.; Chidsey, C.E.D. *Mater. Res. Soc. Symp. Proc.* (Electrochemical Synthesis and Modification of Materials) **1997**, 451, 173-183. "STM Studies of Electrode/Electrolyte Interfaces and Silicon Surface Reactions in Controlled Atmospheres."

1996 Publications

PEER-REVIEWED PAPERS

494. Linford, M.R. "Chemical Functionalization of Hydrogen-Terminated Silicon Surfaces: The First Self-Assembled Monolayers on Silicon." Thesis. **1996**. Stanford University.
495. Linford, M.R.; Iijima, M.; Hattori, T.; Takahashi, Y.; Fukada, E. "Piezoelectricity in aromatic polyamide thin films prepared by vapor deposition polymerization." *Jpn. J. Appl. Phys. Part 1* **1996**, *35*(*2A*), 677-678.

1995 Publications

PEER-REVIEWED PAPERS

496. Linford, M.R.; Fenter, P.; Eisenberger, P.M.; Chidsey, C.E.D. "Alkyl Monolayers on Silicon: Reaction of 1-Alkenes with Hydrogen-Terminated Silicon." *J. Am. Chem. Soc.* **1995**, *117*, 3145-3155.

497. Smalley, J.F.; Feldberg, S.W.; Chidsey, C.E.D.; Linford, M.R.; Newton, M.D.; Liu, Y.-P. "The Kinetics of Electron Transfer through Ferrocene-Terminated Alkanethiol Monolayers on Gold." *J. Phys. Chem.* **1995**, *99*, 13141-13149.

498. Riederer, D.E.; Cooks, R.G.; Linford, M.R. "Abstraction of Multiple Surface Groups by Pyrazine, Pyrene, and $HC_2N^{\cdot+}$ upon Low-Energy Collisions with Self-Assembled Monolayer Surfaces." *J. Mass. Spectrom.* **1995**, *30*, 241 - 246.

CONFERENCE PROCEEDINGS

499. Chidsey, C.E.D.; Linford, M.R. *Proceedings of the Fourth International Symposium on Cleaning Technology in Semiconductor Device Manufacturing*, Chicago, Ill., Oct. 8-13, **1995**, 455-461. "Mechanism for the Chemisorption of Contaminants on Hydrogen-Terminated Silicon Surfaces."

PATENTS

500. Linford, M.R.; Chidsey, C.E.D. U.S. Patent No. 5,429,708: "Molecular Layers Covalently Bonded to Silicon Surfaces" Jul. 4, **1995**.

1994 Publications

PEER-REVIEWED PAPERS

501. Offord, D.A.; John, C.M.; Linford, M.R.; Griffin, J.H. "Contact Angle Goniometry, Ellipsometry, and Time-of-Flight Secondary Ion Mass Spectrometry of Gold Supported, Mixed Self-Assembled Monolayers Formed from Alkyl Mercaptans." *Langmuir* **1994**, *10*, 883-889.

502. Pradeep, T.; Riederer, D.E.; Hoke, S.H.; Ast, T.; Cooks, R.G.; Linford, M.R. "Reactions of Metal Ions at Fluorinated Surfaces: Formation of MF_n^+ (M = Ti, Cr, Fe, Mo, and W; n = 1-5)." *J. Am. Chem. Soc.* **1994**, *116*, 8658-8665.

1993 Publications

PEER-REVIEWED PAPERS

503. Linford, M.R.; Chidsey, C.E.D. "Alkyl Monolayers Covalently Bonded to Silicon Surfaces." *J. Am. Chem. Soc.* **1993**, *115*, 12631-12632.

1992 (and before) Publications

PEER-REVIEWED PAPERS

504. Sin, C.H.; Linford, M.R.; Goates, S.R. "Supercritical Fluid/Supersonic Jet Spectroscopy with a Sheath-Flow Nozzle." *Anal. Chem.* **1992**, *64*, 2, 233-238.
505. Matt Linford and Kenneth Rosenzweig "Statesmanship" *Games Magazine* August, **1985**, puzzle on p.4, answers on p.58.
506. Linford, M.R. "Polyurethane as a Soft Tissue Adhesive: A Preliminary Study." *Base -- A Journal of Science and Technology* **1984**, *3*, 23-24.