



## Piero Pianetta

Professor (Research) of Photon Science and of Electrical Engineering  
Photon Science Directorate

### Bio

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#### BIO

Pianetta's research is directed towards understanding how the atomic and electronic structure of semiconductor interfaces impacts device technology pertaining to advanced semiconductors and photocathodes. His research includes the development of new analytical tools for these studies based on the use of synchrotron radiation. These include the development of ultrasensitive methods to analyze trace impurities on the surface of silicon wafers at levels as low as  $1e-6$  monolayer ( $\sim 1e8$  atoms/cm<sup>2</sup>) and the use of various photoelectron spectroscopies (X-ray photoemission, NEXAFS, X-ray standing waves and photoelectron diffraction) to determine the bonding and atomic structure at the interface between silicon and different passivating layers. Recent projects include the development of high resolution ( $\sim 30$ nm) x-ray spectromicroscopy with applications to energy materials such as Li batteries.

#### ACADEMIC APPOINTMENTS

- Professor (Research), Photon Science Directorate
- Professor (Research), Electrical Engineering
- Member, Bio-X

#### ADMINISTRATIVE APPOINTMENTS

- Deputy Chief Research Officer, SLAC, (2020- present)
- Chair, Photon Science, SLAC, (2016-2020)
- Deputy Director for SSRL, SLAC, (2014- present)
- Director (Interim) for SSRL, SLAC, (2012-2014)
- Deputy Director for SSRL, SLAC, (2010-2012)
- Director (Acting) for SSRL, SLAC, (2009-2010)
- Deputy Director for SSRL, SLAC, (2005-2009)
- Assistant Director for SSRL, SLAC, (1993-2005)
- Associate Director, Stanford Synchrotron Radiation Laboratory, (1985-1993)

#### HONORS AND AWARDS

- Fellow, American Physical Society (2006)

#### PROFESSIONAL EDUCATION

- PhD, Stanford University , Applied Physics (1977)
- MS, Stanford University , Applied Physics (1973)

- BS, Santa Clara University , Physics (1971)

## PATENTS

- L. Hesselink, R.F.W. Pease, P. Pianetta, J.R. Maldonado, ^, Cheng, J. Ryan. "United States Patent 9,520,260 Photo emitter x-ray source array (PeXSA)", The Board of Trustees of the Leland Stanford Junior University, Palo Alto, CA (US), Dec 13, 2016
- J.R. Maldonado, Y-T Cheng, P. Pianetta, R.F.W. Pease, L. Hesselink. "United States Patent 9,406,488 Enhanced photoelectron sources using electron bombardment", The Board of Trustees of the Leland Stanford Junior University, Palo Alto, CA, Aug 2, 2016

## LINKS

- My SLAC faculty information: <https://faculty.slac.stanford.edu/photon-science-faculty-bios#Pianetta>
- My Google Scholar Page: [https://scholar.google.com/scholar?hl=en&as\\_sdt=0%2C5&q=piero+pianetta&btnG=](https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=piero+pianetta&btnG=)

## Teaching

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### COURSES

#### 2025-26

- The Electronic Structure of Surfaces and Interfaces: EE 329, PHOTON 329 (Aut)

#### 2023-24

- The Electronic Structure of Surfaces and Interfaces: EE 329 (Aut)

### STANFORD ADVISEES

#### Postdoctoral Faculty Sponsor

Mathias Kiefer, Heemin Lee, Otavio Marques, Dean Miller, Liam Nagle Cocco, Tolga Han Ulucan, Igor Daniel de Araujo Evangelista

#### Doctoral (Program)

Maximus Di Perna, Melanie Murillo, Charlotte Wehner

## Publications

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### PUBLICATIONS

- **Revealing multiscale competing processes in the solid-state synthesis of single-crystalline layered oxide positive electrodes.** *Nature communications*  
Xue, Z., Sun, T., Oruganti, S., Huang, X., Parkinson, D. Y., Chu, Y. S., Pianetta, P., Ge, M., Liu, Y.  
2026
- **Electrode strain dynamics in layered intercalation battery cathodes.** *Science (New York, N.Y.)*  
Sun, T., Qian, G., Fang, R., Zan, G., Xue, Z., Trask, S. E., Gutierrez, A., Li, W., Deng, S., Li, L., Yun, W., Pianetta, P., Yu, et al  
2025; 390 (6779): 1272-1277
- **Mechanistic Considerations for Battery Charging Protocol Design** *ADVANCED ENERGY MATERIALS*  
Li, W., Yanyachi, A., Xia, J., Kuppan, S., Zhou, J., Wang, Y., Li, Y., Pianetta, P., Zhao, K., Mitlin, D., Ezekoye, O., Xiao, J., Wang, et al  
2025
- **Impacts of the Conductive Networks on Solid-State Battery Operation.** *Angewandte Chemie (International ed. in English)*  
Deng, S., Wang, Y., Sun, T., Li, W., Ge, M., Wang, J., Cloetens, P., Pianetta, P., Mitlin, D., Liu, Y.  
2025: e202511534
- **Pinpointing Chemomechanical Origins of Na Cathode Degradation.** *Journal of the American Chemical Society*  
Sun, T., Wu, B., Deng, S., Guo, Y., Shi, J., Zhang, X., Shi, X., Qian, G., Wang, J., Pianetta, P., Zhou, J., Guo, Y., Liu, et al  
2025
- **In-device Battery Failure Analysis.** *Advanced materials (Deerfield Beach, Fla.)*  
Qian, G., Zan, G., Li, J., Meng, D., Sun, T., Thampy, V., Yanyachi, A. M., Huang, X., Yan, H., Chu, Y. S., Gul, S., Huang, J., Kelly, et al

2025; 37 (10): e2416915

- **Mesoscale interplay among composition heterogeneity, lattice deformation, and redox stratification in single-crystalline layered oxide cathode** *ESCIENCE*  
Xue, Z., Wu, F., Ge, M., Huang, X., Chu, Y. S., Pianetta, P., Liu, Y.  
2024; 4 (4)
- **Deep Learning for Spectroscopic X-ray Nano-Imaging Denoising** *ADVANCED INTELLIGENT SYSTEMS*  
Fu, T., Zhang, K., Yuan, Q., Li, J., Pianetta, P., Liu, Y.  
2024
- **Image registration for in situ X-ray nano-imaging of a composite battery cathode with deformation.** *Journal of synchrotron radiation*  
Su, B., Qian, G., Gao, R., Tao, F., Zhang, L., Du, G., Deng, B., Pianetta, P., Liu, Y.  
2024
- **Multi-modal X-ray microscopy for chemical analysis** *TRAC-TRENDS IN ANALYTICAL CHEMISTRY*  
Su, B., Li, J., Deng, B., Pianetta, P., Liu, Y.  
2024; 171
- **Asynchronous domain dynamics and equilibration in layered oxide battery cathode.** *Nature communications*  
Xue, Z., Sharma, N., Wu, F., Pianetta, P., Lin, F., Li, L., Zhao, K., Liu, Y.  
2023; 14 (1): 8394
- **Stabilizing Ni-rich layered cathode for high-voltage operation through hierarchically heterogeneous doping with concentration gradient** *MATERIALS TODAY CHEMISTRY*  
Chen, G., Qian, G., Zan, G., Lun, M., Su, F., Stripe, B., Chu, Y. S., Pianetta, P., Huang, X., Li, J.  
2024; 35
- **Nanoscale chemical imaging with structured X-ray illumination.** *Proceedings of the National Academy of Sciences of the United States of America*  
Li, J., Chen, S., Ratner, D., Blu, T., Pianetta, P., Liu, Y.  
2023; 120 (49): e2314542120
- **The S-T component in the Si 2p photoemission spectrum from H-terminated and oxidized Si (001) surfaces** *JOURNAL OF VACUUM SCIENCE & TECHNOLOGY A*  
Herrera-Gomez, A., Vazquez-Lepe, M. O., Mani-Gonzalez, P. G., Pianetta, P., Aguirre-Tostado, F. S., Ceballos-Sanchez, O.  
2023; 41 (4)
- **Exploring the Ultrafast Charge-Transfer and Redox Dynamics in Layered Transition Metal Oxides** *CONDENSED MATTER*  
Qian, G., Huang, X., Lee, J., Pianetta, P., Liu, Y.  
2023; 8 (1)
- **Perspective-Morphology and Dynamics of Metal Dendrites in Batteries Revealed by X-ray Computed Tomography** *JOURNAL OF THE ELECTROCHEMICAL SOCIETY*  
Qian, G., Zan, G., Pianetta, P., Liu, Y.  
2022; 169 (12)
- **In-Situ Visualization of the Transition Metal Dissolution in Layered Cathodes** *JOURNAL OF ELECTROCHEMICAL ENERGY CONVERSION AND STORAGE*  
Qian, G., Zan, G., Li, J., Zhang, J., Pianetta, P., Liu, Y.  
2022; 19 (4)
- **In situ visualization of multicomponents coevolution in a battery pouch cell.** *Proceedings of the National Academy of Sciences of the United States of America*  
Zan, G., Qian, G., Gul, S., Li, J., Matusik, K., Wang, Y., Lewis, S., Yun, W., Pianetta, P., Vine, D. J., Li, L., Liu, Y.  
2022; 119 (29): e2203199119
- **Data-Driven Lithium-Ion Battery Cathode Research with State-of-the-Art Synchrotron X-ray Techniques** *ACCOUNTS OF MATERIALS RESEARCH*  
Xue, Z., Li, J., Pianetta, P., Liu, Y.  
2022

- **Deep-Learning-Enabled Crack Detection and Analysis in Commercial Lithium-Ion Battery Cathodes** *ADVANCED FUNCTIONAL MATERIALS*  
Fu, T., Monaco, F., Li, J., Zhang, K., Yuan, Q., Cloetens, P., Pianetta, P., Liu, Y.  
2022
- **Dynamics of particle network in composite battery cathodes.** *Science (New York, N.Y.)*  
Li, J., Sharma, N., Jiang, Z., Yang, Y., Monaco, F., Xu, Z., Hou, D., Ratner, D., Pianetta, P., Cloetens, P., Lin, F., Zhao, K., Liu, et al  
2022; 376 (6592): 517-521
- **Structural, Dynamic, and Chemical Complexities in Zinc Anode of an Operating Aqueous Zn-Ion Battery** *ADVANCED ENERGY MATERIALS*  
Qian, G., Zan, G., Li, J., Lee, S., Wang, Y., Zhu, Y., Gul, S., Vine, D. J., Lewis, S., Yun, W., Ma, Z., Pianetta, P., Lee, et al  
2022
- **Probing lattice defects in crystalline battery cathode using hard X-ray nanoprobe with data-driven modeling** *ENERGY STORAGE MATERIALS*  
Li, J., Hong, Y., Yan, H., Chu, Y. S., Pianetta, P., Li, H., Ratner, D., Huang, X., Yu, X., Liu, Y.  
2022; 45: 647-655
- **Value-creating upcycling of retired electric vehicle battery cathodes** *CELL REPORTS PHYSICAL SCIENCE*  
Qian, G., Li, Z., Wang, Y., Xie, X., He, Y., Li, J., Zhu, Y., Xie, S., Cheng, Z., Che, H., Shen, Y., Chen, L., Huang, et al  
2022; 3 (2)
- **Thermal-healing of lattice defects for high-energy single-crystalline battery cathodes.** *Nature communications*  
Li, S., Qian, G., He, X., Huang, X., Lee, S., Jiang, Z., Yang, Y., Wang, W., Meng, D., Yu, C., Lee, J., Chu, Y. S., Ma, et al  
2022; 13 (1): 704
- **Structural and chemical evolution in layered oxide cathodes of lithium-ion batteries revealed by synchrotron techniques.** *National science review*  
Qian, G., Wang, J., Li, H., Ma, Z., Pianetta, P., Li, L., Yu, X., Liu, Y.  
2022; 9 (2): nwab146
- **In Situ Visualization of Li-Whisker with Grating-Interferometry-Based Tricontrast X-ray Microtomography** *ACS MATERIALS LETTERS*  
Zan, G., Qian, G., Gul, S., Pan, H., Li, Q., Li, J., Vine, D. J., Lewis, S., Yun, W., Pianetta, P., Li, H., Yu, X., Liu, et al  
2021; 3 (12): 1786-1792
- **Machine-and-data intelligence for synchrotron science** *NATURE REVIEWS PHYSICS*  
Li, J., Huang, X., Pianetta, P., Liu, Y.  
2021
- **Deep-learning-based image registration for nano-resolution tomographic reconstruction.** *Journal of synchrotron radiation*  
Fu, T., Zhang, K., Wang, Y., Li, J., Zhang, J., Yao, C., He, Q., Wang, S., Huang, W., Yuan, Q., Pianetta, P., Liu, Y.  
2021; 28 (Pt 6): 1909-1915
- **The role of structural defects in commercial lithium-ion batteries** *CELL REPORTS PHYSICAL SCIENCE*  
Qian, G., Monaco, F., Meng, D., Lee, S., Zan, G., Li, J., Karpov, D., Gul, S., Vine, D., Stripe, B., Zhang, J., Lee, J., Ma, et al  
2021; 2 (9)
- **Novel Ultrabright and Air-Stable Photocathodes Discovered from Machine Learning and Density Functional Theory Driven Screening.** *Advanced materials (Deerfield Beach, Fla.)*  
Antoniuk, E. R., Schindler, P., Schroeder, W. A., Dunham, B., Pianetta, P., Vecchione, T., Reed, E. J.  
2021: e2104081
- **Multiphase, Multiscale Chemomechanics at Extreme Low Temperatures: Battery Electrodes for Operation in a Wide Temperature Range** *ADVANCED ENERGY MATERIALS*  
Li, J., Li, S., Zhang, Y., Yang, Y., Russi, S., Qian, G., Mu, L., Lee, S., Yang, Z., Lee, J., Pianetta, P., Qiu, J., Ratner, et al  
2021
- **High-resolution multicontrast tomography with an X-ray microarray anode-structured target source.** *Proceedings of the National Academy of Sciences of the United States of America*  
Zan, G., Gul, S., Zhang, J., Zhao, W., Lewis, S., Vine, D. J., Liu, Y., Pianetta, P., Yun, W.  
2021; 118 (25)

- **Fast Li Plating Behavior Probed by X-ray Computed Tomography.** *Nano letters*  
Pan, H., Fu, T., Zan, G., Chen, R., Yao, C., Li, Q., Pianetta, P., Zhang, K., Liu, Y., Yu, X., Li, H.  
2021
- **Selective dopant segregation modulates mesoscale reaction kinetics in layered transition metal oxide** *NANO ENERGY*  
Qian, G., Huang, H., Hou, F., Wang, W., Wang, Y., Lin, J., Lee, S., Yan, H., Chu, Y. S., Pianetta, P., Huang, X., Ma, Z., Li, et al  
2021; 84
- **Understanding multi-scale battery degradation with a macro-to-nano zoom through its hierarchy** *JOURNAL OF MATERIALS CHEMISTRY A*  
Zan, G., Zhang, J., Monaco, F., Gul, S., Qian, G., Li, J., Vine, D. J., Cloetens, P., Yun, W., Pianetta, P., Liu, Y.  
2021
- **Understanding the Mesoscale Degradation in Nickel-Rich Cathode Materials through Machine-Learning-Revealed Strain-Redox Decoupling** *ACS ENERGY LETTERS*  
Qian, G., Zhang, J., Chu, S., Li, J., Zhang, K., Yuan, Q., Ma, Z., Pianetta, P., Li, L., Jung, K., Liu, Y.  
2021; 6 (2): 687–93
- **Automatic 3D image registration for nano-resolution chemical mapping using synchrotron spectro-tomography.** *Journal of synchrotron radiation*  
Zhang, J., Hu, J., Jiang, Z., Zhang, K., Liu, P., Wang, C., Yuan, Q., Pianetta, P., Liu, Y.  
2021; 28 (Pt 1): 278–82
- **Depth-dependent valence stratification driven by oxygen redox in lithium-rich layered oxide.** *Nature communications*  
Zhang, J., Wang, Q., Li, S., Jiang, Z., Tan, S., Wang, X., Zhang, K., Yuan, Q., Lee, S., Titus, C. J., Irwin, K. D., Nordlund, D., Lee, et al  
2020; 11 (1): 6342
- **Operando Tailoring of Defects and Strains in Corrugated beta-Ni(OH)<sub>2</sub> Nanosheets for Stable and High-Rate Energy Storage.** *Advanced materials (Deerfield Beach, Fla.)*  
Li, S., Sharma, N., Yu, C., Zhang, Y., Wan, G., Fu, R., Huang, H., Sun, X., Lee, S., Lee, J., Nordlund, D., Pianetta, P., Zhao, et al  
2020: e2006147
- **Hybrid real- and reciprocal-space full-field imaging with coherent illumination** *JOURNAL OF OPTICS*  
Li, P., Wakatsuki, S., Pianetta, P. A., Liu, Y.  
2020; 22 (11)
- **Hierarchical Defect Engineering for LiCoO<sub>2</sub> through Low-Solubility Trace Element Doping** *CHEM*  
Hong, Y., Huang, X., Wei, C., Wang, J., Zhang, J., Yan, H., Chu, Y. S., Pianetta, P., Xiao, R., Yu, X., Liu, Y., Li, H.  
2020; 6 (10): 2759–69
- **Mutual modulation between surface chemistry and bulk microstructure within secondary particles of nickel-rich layered oxides.** *Nature communications*  
Li, S., Jiang, Z., Han, J., Xu, Z., Wang, C., Huang, H., Yu, C., Lee, S., Pianetta, P., Ohldag, H., Qiu, J., Lee, J., Lin, et al  
2020; 11 (1): 4433
- **Generalizable density functional theory based photoemission model for the accelerated development of photocathodes and other photoemissive devices** *PHYSICAL REVIEW B*  
Antoniuk, E. R., Yue, Y., Zhou, Y., Schindler, P., Schroeder, W., Dunham, B., Pianetta, P., Vecchione, T., Reed, E. J.  
2020; 101 (23)
- **Machine-learning-revealed statistics of the particle-carbon/binder detachment in lithium-ion battery cathodes.** *Nature communications*  
Jiang, Z., Li, J., Yang, Y., Mu, L., Wei, C., Yu, X., Pianetta, P., Zhao, K., Cloetens, P., Lin, F., Liu, Y.  
2020; 11 (1): 2310
- **Quantifying redox heterogeneity in single-crystalline LiCoO<sub>2</sub> cathode particles.** *Journal of synchrotron radiation*  
Wei, C., Hong, Y., Tian, Y., Yu, X., Liu, Y., Pianetta, P.  
2020; 27 (Pt 3): 713–19
- **Operando Revealing Dynamic Reconstruction of NiCo Carbonate Hydroxide for High-Rate Energy Storage** *JOULE*  
Li, S., Zhang, Y., Liu, N., Yu, C., Lee, S., Zhou, S., Fu, R., Yang, J., Guo, W., Huang, H., Lee, J., Wang, C., Kim, et al  
2020; 4 (3): 673–87

- **Revealing the inhomogeneous surface chemistry on the spherical layered oxide polycrystalline cathode particles** *CHINESE PHYSICS B*  
Jiang, Z., Li, S., Xu, Z., Nordlund, D., Ohldag, H., Pianetta, P., Lee, J., Lin, F., Liu, Y.  
2020; 29 (2)
- **Surface Photovoltage-Induced Ultralow Work Function Material for Thermionic Energy Converters** *ACS ENERGY LETTERS*  
Schindler, P., Riley, D. C., Bargatin, I., Sahasrahudde, K., Schwede, J. W., Sun, S., Pianetta, P., Shen, Z., Howe, R. T., Melosh, N. A.  
2019; 4 (10): 2436–43
- **Simultaneous three-dimensional elemental mapping of Hollandite and Pyrochlore material phases in ceramic waste form materials** *JOURNAL OF THE AMERICAN CERAMIC SOCIETY*  
Damian, P. C., Cocco, A. P., Wrubel, J. A., Hong, T., Bordia, R. K., Liu, Y., Pianetta, P., Amoroso, J. W., Brinkman, K. S., Chiu, W. K. S.  
2019; 102 (9): 5620–31
- **Quantification of Heterogeneous Degradation in Li-Ion Batteries** *ADVANCED ENERGY MATERIALS*  
Yang, Y., Xu, R., Zhang, K., Lee, S., Mu, L., Liu, P., Waters, C. K., Spence, S., Xu, Z., Wei, C., Kautz, D. J., Yuan, Q., Dong, et al  
2019; 9 (25)
- **High-Voltage Charging-Induced Strain, Heterogeneity, and Micro-Cracks in Secondary Particles of a Nickel-Rich Layered Cathode Material** *ADVANCED FUNCTIONAL MATERIALS*  
Mao, Y., Wang, X., Xia, S., Zhang, K., Wei, C., Bak, S., Shadike, Z., Liu, X., Yang, Y., Xu, R., Pianetta, P., Ermon, S., Stavitski, et al  
2019; 29 (18)
- **Surface-to-Bulk Redox Coupling through Thermally Driven Li Redistribution in Li- and Mn-Rich Layered Cathode Materials.** *Journal of the American Chemical Society*  
Li, S. n., Lee, S. J., Wang, X. n., Yang, W. n., Huang, H. n., Swetz, D. S., Doriese, W. B., O'Neil, G. C., Ullom, J. N., Titus, C. J., Irwin, K. D., Lee, H. K., Nordlund, et al  
2019
- **Thermally driven mesoscale chemomechanical interplay in Li<sub>0.5</sub>Ni<sub>0.6</sub>Mn<sub>0.2</sub>Co<sub>0.2</sub>O<sub>2</sub> cathode materials** *JOURNAL OF MATERIALS CHEMISTRY A*  
Wei, C., Zhang, Y., Lee, S., Mu, L., Liu, J., Wang, C., Yang, Y., Doeff, M., Pianetta, P., Nordlund, D., Du, X., Tian, Y., Zhao, et al  
2018; 6 (45): 23055–61
- **Chemomechanical interplay of layered cathode materials undergoing fast charging in lithium batteries** *NANO ENERGY*  
Xia, S., Mu, L., Xu, Z., Wang, J., Wei, C., Liu, L., Pianetta, P., Zhao, K., Yu, X., Lin, F., Liu, Y.  
2018; 53: 753–62
- **Automatic projection image registration for nanoscale X-ray tomographic reconstruction.** *Journal of synchrotron radiation*  
Yu, H., Xia, S., Wei, C., Mao, Y., Larsson, D., Xiao, X., Pianetta, P., Yu, Y. S., Liu, Y.  
2018; 25 (Pt 6): 1819–26
- **Understanding the Effect of Local Short-Range Ordering on Lithium Diffusion in Li<sub>1.3</sub>Nb<sub>0.3</sub>Mn<sub>0.4</sub>O<sub>2</sub> Single-Crystal Cathode** *CHEM*  
Kan, W., Deng, B., Xu, Y., Shukla, A., Bo, T., Zhang, S., Liu, J., Pianetta, P., Wang, B., Liu, Y., Chen, G.  
2018; 4 (9): 2108–23
- **Propagation topography of redox phase transformations in heterogeneous layered oxide cathode materials** *NATURE COMMUNICATIONS*  
Mu, L., Yuan, Q., Tian, C., Wei, C., Zhang, K., Liu, J., Pianetta, P., Doeff, M. M., Liu, Y., Lin, F.  
2018; 9: 2810
- **Mesoscale Battery Science: The Behavior of Electrode Particles Caught on a Multispectral X-ray Camera.** *Accounts of chemical research*  
Wei, C., Xia, S., Huang, H., Mao, Y., Pianetta, P., Liu, Y.  
2018
- **Scientific data mining in nanoscale visualization of catalysis at work**  
Liu, Y., Meirer, F., Weckhuysen, B., Pianetta, P.  
AMER CHEMICAL SOC.2018
- **Intensity modulation of the Shirley background of the Cr 3p spectra with photon energies around the Cr 2p edge** *SURFACE AND INTERFACE ANALYSIS*  
Herrera-Gomez, A., Cabrera-German, D., Dutoi, A. D., Vazquez-Lepe, M., Aguirre-Tostado, S., Pianetta, P., Nordlund, D., Cortazar-Martinez, O., Torres-Ochoa, A., Ceballos-Sanchez, O., Gomez-Munoz, L.

2018; 50 (2): 246–52

- **Finding a Needle in the Haystack: Identification of Functionally Important Minority Phases in an Operating Battery** *NANO LETTERS*  
Zhang, K., Ren, F., Wang, X., Hu, E., Xu, Y., Yang, X., Li, H., Chen, L., Pianetta, P., Mehta, A., Yu, X., Liu, Y.  
2017; 17 (12): 7782–88
- **Three-dimensional mapping of crystalline ceramic waste form materials** *JOURNAL OF THE AMERICAN CERAMIC SOCIETY*  
Cocco, A. P., DeGostin, M. B., Wrubel, J. A., Damian, P. J., Hong, T., Xu, Y., Liu, Y., Pianetta, P., Amoroso, J. W., Brinkman, K. S., Chiu, W. K. S.  
2017; 100 (8): 3722-3735
- **In situ Visualization of State-of-Charge Heterogeneity within a LiCoO<sub>2</sub> Particle that Evolves upon Cycling at Different Rates** *ACS ENERGY LETTERS*  
Xu, Y., Hu, E., Zhang, K., Wang, X., Borzenets, V., Sun, Z., Pianetta, P., Yu, X., Liu, Y., Yang, X., Li, H.  
2017; 2 (5): 1240-1245
- **Ultrasensitive probing of the local electronic structure of nitrogen doped carbon and its applications to 2D electronics, catalysis and biophysics**  
Lee, S., Mori, R., Alpert, B., Baker, M., Berry, J., Cho, H., Denison, E., Doriese, W., Fowler, J., Gaffney, K., Gao, B., Gard, J., Hilton, et al  
AMER CHEMICAL SOC.2017
- **Applications of x-ray tomography across multiple length scales**  
Pianetta, P.  
AMER CHEMICAL SOC.2017
- **Back-gated graphene anode for more efficient thermionic energy converters** *NANO ENERGY*  
Yuan, H., Riley, D. C., Shen, Z., Pianetta, P. A., Melosh, N. A., Howe, R. T.  
2017; 32: 67-72
- **Determination of copper nanoparticle size distributions with total reflection X-ray fluorescence spectroscopy** *JOURNAL OF SYNCHROTRON RADIATION*  
Singh, A., Luening, K., Brennan, S., Homma, T., Kubo, N., Nowak, S. H., Pianetta, P.  
2017; 24: 283-287
- **Analysis of Cathodic Reaction Process of SiCl<sub>4</sub> during Si Electrodeposition in Ionic Liquids** *JOURNAL OF THE ELECTROCHEMICAL SOCIETY*  
Tsuyuki, Y., Fujimura, T., Kunimoto, M., Fukunaka, Y., Pianetta, P., Homma, T.  
2017; 164 (14): D994–D998
- **Unsupervised Data Mining in nanoscale X-ray Spectro-Microscopic Study of NdFeB Magnet** *SCIENTIFIC REPORTS*  
Duan, X., Yang, F., Antono, E., Yang, W., Pianetta, P., Ermon, S., Mehta, A., Liu, Y.  
2016; 6
- **Interface Engineering for Atomic Layer Deposited Alumina Gate Dielectric on SiGe Substrates.** *ACS applied materials & interfaces*  
Zhang, L., Guo, Y., Hassan, V. V., Tang, K., Foad, M. A., Woicik, J. C., Pianetta, P., Robertson, J., McIntyre, P. C.  
2016; 8 (29): 19110-19118
- **Recent applications of hard x-ray photoelectron spectroscopy** *JOURNAL OF VACUUM SCIENCE & TECHNOLOGY A*  
Weiland, C., Rumaiz, A. K., Pianetta, P., Woicik, J. C.  
2016; 34 (3)
- **Reverse engineering ancient Athenian pottery: A collaboration between cultural heritage, industry, and academia**  
Trentelman, K., Cianchetta, I., Walton, M., Mehta, A., Pianetta, P., Foran, B., Saunders, D., Maish, J.  
AMER CHEMICAL SOC.2016
- **Imaging of hierarchical structures with x-rays**  
Pianetta, P.  
AMER CHEMICAL SOC.2016
- **To get the most out of high resolution X-ray tomography: A review of the post-reconstruction analysis** *SPECTROCHIMICA ACTA PART B-ATOMIC SPECTROSCOPY*  
Liu, Y., Kiss, A. M., Larsson, D. H., Yang, F., Pianetta, P.

2016; 117: 29-41

- **Formation of Si<sup>1+</sup> in the early stages of the oxidation of the Si[001] 2x1 surface** *JOURNAL OF VACUUM SCIENCE & TECHNOLOGY A*  
Herrera-Gomez, A., Aguirre-Tostado, F., Pianetta, P.  
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