Miaofang Chi

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Current Position: Senior Staff Scientist, Electron Microscopy Group, Center for Nanophase Materials Sciences, Oak Ridge National Laboratory

Research Focus:

- The developments of new electron microscopy techniques, emphasizing on imaging functionalities under *in situ* operation and synthesis conditions (e.g. biasing, annealing, gas and liquid environments) with desirable spatial and temporal resolutions.
- Energy, mass and charge transport in materials and at their interfaces for energy and information technologies, e.g. batteries, solid oxide fuel cells, memristors, and electrolyte-gating systems.
- The design of functional interfaces with controlled charge transfer behavior for exceptional energy transport, storage, and transformations.

Education:

University of California, Davis	Ph.D.	09/2003 – 01/ 2008	Materials Science and Engineering
Shanghai Institute of Ceramics	M.E.	09/ 2000 – 07/ 2003	Materials Science and Engineering
Jilin University	B.E.	09/ 1993 – 07/ 1997	Materials Science

Research and Professional Experience:

Senior Staff Scientist	2017 - current	Oak Ridge National Laboratory, TN
R&D Staff Scientist	2008 - 2017	Oak Ridge National Laboratory, TN
R&D Scientist	2008 – 2008	Gatan Co., Pleasanton, CA
Research Fellow	2006 – 2008	Lawrence Livermore National Laboratory, Livermore, CA
Research Assistant	2004 - 2006	Lawrence Berkeley National Laboratory, CA

Significant Awards and Honors:

- 2016, Burton Medal Award, Microscopy Society of America.
- 2015, Significant Event Award, Oak Ridge National Laboratory
- 2015, Director's Award for Outstanding Accomplishment in Science & Technology, ORNL.
- 2015, Early Career Researcher Award, ORNL.
- 2015, Significant Event Award, Oak Ridge National Laboratory.
- 2010, Significant Publications Award, Materials Sciences & Technology Division, ORNL.
- 2006-2008, Lawrence Graduate Research Fellowship, Lawrence Livermore National Lab., Livermore, CA.
- 2007, Distinguished Scholar Award (MAS), Microscopy & Microanalysis, Fort Lauderdale, FL.
- 2007, Graduate Student Award, 11th Frontiers of Electron Microscopy in Materials Science Conference.

Selected Recent Publications (Total publications: >120; Citations: >8000; h-index: 44; a full list of publications is attached at the end; *leading author, Google scholar: https://scholar.google.com/citations?user=LLnw868AAAAJ&hl=en&oi=ao)

1. M. Zhang, K. Yin, Z. Hood, P. Parans,… M. Chi*, "In situ TEM Observation of the Electrochemical Lithiation of N-doped Anatase TiO_2 Nanotubes as Anodes for Lithium-ion Batteries," ***J. Mater. Chem. A*** (accepted).
2. K. Yin, M. Zhang, Z. Hood, S. Meng, M. Chi*, "Self-Assembled Framework Formed during Lithiation of SnS_2 Nanoplates Revealed by In Situ Electron Microscopy," ***Acc. Chem. Res.,*** 50 (7), 1513–1520 (2017).
3. C. Ma, Y. Cheng, J. Sakamoto, N. Dudney, M. Chi*, "Li-metal/Solid Electrolyte Interfacial Stability Elucidated via in situ Electron Microscopy," ***Nano Letters,*** 16 (11), 7030-7036 (2016).

4. C. Ma, Y. Cheng, K. Chen, J. Li, …, M. Chi*, "Mesoscopic Framework Enables Facile Ionic Transport in Solid Electrolytes for Li Batteries," ***Adv Energy Mater*** 6(11), 1600053 (2016).
5. W. Gao, Z. Hood, and M. Chi*, "Interfaces in Heterogeneous Catalysts: Advancing Mechanistic Understanding through Atomic Scale Measurements, " ***Acc. Chem. Res.,*** 50(4), 787-795 (2017).
6. C. Ma, M. Chi*, "Novel solid electrolytes for Li-ion batteries: a perspective from electron microscopy studies," ***Frontiers in Energy Research*** 4(23), (2016).
7. M. Chi*, C. Wang, Y. Lei, G. Wang, D. Li, K.L. More, A. Lupini, L.F. Allard, N.M. Markovic, and V.R. Stamenkovic, "Surface Faceting and Elemental Diffusion Behavior at Atomic Scale for Alloy Nanoparticles During *In Situ* Annealing," ***Nat. Comm.*** 6 Article 8925 (2015).
8. C. Ma, E. Rangasamy, C. Liang, J. Sakamoto, K.L. More, and M. Chi*, "Excellent Stability of a Lithium-Ion-Conducting Solid Electrolyte upon Reversible Li^+/H^+ Exchange in Aqueous Solutions," ***Angewandte Chemie*** International Edition 54[1] 129-133 (2015).
9. C. Ma, K. Chen, C. Liang, C.W. Nan, R. Ishikawa, K.L. More, and M. Chi*, "Atomic-Scale Origin of the Large Grain-Boundary Resistance in Perovskite Li-Ion-Conducting Solid Electrolytes," ***Energy & Environmental Science*** 7[5] 1638-1642 (2014).
10. Y. Wu, C. Ma, J. Yang, Z. Li, C. Liang, L.F. Allard, and M. Chi*, "Probing the Initiation of Voltage Decay in Li-Rich Layered Cathode Materials at Atomic Scale," ***J. Mater. Chem. A*** 3[10] 5385-5391 (2015).
11. L. Zhang, L.T. Roling, X. Wang, M. Vara, M. Chi, …, M. Mavrikakis, and Y. Xia, "Platinum-Based Nanocages with Subnanometer-Thick Walls and Well-Defined Facets," ***Science*** 349 412-416 (2015).
12. J.C. Li, C. Ma, M. Chi, C. Liang, and N.J. Dudney, "Solid Electrolyte: The Key for High-Voltage Lithium Batteries," ***Advanced Energy Materials*** 5[4] Article 1401408 (2015).
13. C. Chen, Y. Kang, Z. Huo, Z. Zhu, W. Huang, H.L. Xin, J.D. Snyder, D. Li, J. A. Herron, M. Mavrikakis, M. Chi, K.L. More, Y.D. Li, N.M. Markovic, and V.R. Stamenkovic, "Highly Crystalline Multimetallic Nanoframes with Three-Dimensional Electrocatalytic Surfaces," ***Science*** 343 1339-1343 (2014).

Selected Invited Presentations:

- The 2018 MRS Spring meeting, EN1 Solid-solid interfaces in batteries, energy storage and conversion -- diagnostic and modeling; and EN6 "Safer and More Energy Dense Rechargeable Batteries" (scheduled).
- Golden Research Conference – electrical energy storage (2018) (scheduled).
- The 2018 Conference on Electronic and Advanced Materials (ceramics.org/eam2018), S5 Ion-conducting ceramics Orlando, Florida, Jan. 17-19 (2018) (scheduled).
- Golden Research Conference – Ceramics (2018) (scheduled).
- Next-Generation Battery Research - International Battery Seminar & Exhibit 2018, Fort Lauderdale, Florida, March 27 (2018) (scheduled).
- The 2017 MRS fall meeting, ES06: Alkali Solid Electrolytes and Solid-State Batteries (scheduled).
- Golden Research Conference - Nano-Mechanical Interfaces, July 30 (2017).
- Microscopy and microanalysis, Aug 5 (2017)
- The 21st International Conference of Solid State Ionics, Padua, Italy, June 18 (2017).
- McMaster University, Advanced electron microscopy for materials/chemistry research, June 2 (2017).
- Georgia Tech/ORNL workshop on chemical imaging, Atlanta, GA. Jan. 30 (2017).
- The School of Chemistry and Biochemistry, Georgia Institute of Technology, Atlanta, GA. Jan. 18 (2017).
- AVS 63rd International Symposium & Exhibition, Nashville, TN, Nov. 6-11 (2016).
- The 251st ACS National Meeting & Exposition, San Diego, CA, March 13-17 (2016).
- In-situ Heating in Aberration-Corrected STEM Workshop, Georgia Institute of Technology (2016)
- ORNL outreach seminar, Feb. 11th 2016.
- The Electrochemical Society, University of Kentucky Chapter, (2015).
- International Conference of Pacific Rim Ceramic Societies (PacRim-11), Jeju Island, Korea. (2015).
- Georgia Institute of Technology, Atlanta, GA. (2014).
- Battery Congress, Troy, MI. (2013).
- American Chemical Society, Indianapolis, IN. (2013).
- Microscopy & Microanalysis 2011 Annual Meeting, Nashville, TN. (2011).

- PV School at ORNL User Meeting, (2012)
- University of California, Riverside, (2010).
- University of California, San Diego, (2011).
- Center for Functional Nanomaterials, Brookhaven National Laboratory, (2008).
- EELS Imaging & Analysis School, Gatan Inc., (2008).
- Seagate Inc. R&D Center, CA "Application of STEM/EELS to Semiconductor Materials" (2008).

Synergistic Activities

Committee member:

- Award Committee of Microscopy Society of America (2016 – present).
- Panel committee at DOE-BES Basic Research Needs for Electrical Energy Storage: panel 5 "All Solid-State Batteries" and "Cross-cutting research for EES" 2017.
- Committee member of "Future directions for microscopy society of America" at Microscopy and Microanalysis 2017.
- Organizer of the postdoc-mix event for Microscopy and Microanalysis (2015 – present).

Symposia Organized and other committees Served:

- Symposium Organizer "Direct Imaging of Materials Functionality in aberration-corrected electron microscopes," Microscopy and Microanalysis 2018.
- Symposium Organizer "Frontiers in functional imaging by aberration-corrected electron microscopy," Materials Research Society 2018 Spring Meeting, AZ.
- Symposium Organizer "In-situ Characterization of Material Synthesis and Properties at the Nanoscale with TEM," Materials Research Society 2014 Spring Meeting, San Francisco, CA.
- Activity co-organizer at Postdoc Mixer, Microscopy & Microanalysis 2014 Annual Meeting, Hartford, CT.
- Symposium Organizer "Advanced Microscopy Characterizations of Nanoparticles" Microscopy & Microanalysis 2013 Annual Meeting, Indianapolis, IN.
- Pre-meeting Congress Co-Organizer "Artifacts and Interpretation of Aberration-Corrected Electron Microscopy," Microscopy & Microanalysis 2011 Annual Meeting, Nashville, TN.
- Symposium Co-Organizer "A02 Aberration-Corrected Electron Microscopy: Exploring Materials Through New Eyes," Microscopy & Microanalysis 2010 Annual Meeting, Portland, OR.

Regular reviewer for Chemistry of Materials, Energy and Environmental Science, Angwandte Chemie, Nano Letters, and Journal of Physical Chemistry, Journal of Power Sources, Journal of Materials Chemistry A, C, and Nature Communications etc.

Professional Memberships: Materials Research Society; Microscopy Society of America

Graduate Students and Postdoctoral Scholars Supervised:

- Graduate Students: Boyu Liu (XAJU, China, currently a professor at XAJU); Danna Qian (UCSD, 2014); Minghao Zhang (UCSD); Xi Chen (Univ. of Wisc. Milwaukee, current); Zach Hood (Georgia Tech, current).
- Postdoctoral Scholars: Xiaoming Liu (current); Cheng Ma (currently as a professor at USTC, China); Wenpei Gao (UC-Irvine).

*Most student and postdoc researchers came from non-microscopy university research groups with very limited background in STEM. However, the thesis research of all students supervised by me has focused on materials investigations using electron microscopy and other relevant characterizations. An example is Zach Hood, a student from Georgia Tech. The research group that Mr. Hood was part of at Georgia Tech focused on nanoparticle synthesis and catalysts. However, his thesis centers on the synthesis and characterization of solid electrolyte materials for batteries, a research strength of my group.

Full List of Publications (Total publications: >110; Citations: >10000; h-index: 50; 6 Science, 2 Nat. Comm. 9 Ang. Chemie., 4 Energy & Environ. Sci.)

1. W. Gao, Z. D. Hood, M. Chi, "Interfaces in Heterogeneous Catalysts: Advancing Mechanistic Understanding through Atomic-Scale Measurements," ***Accounts of Chemical Research*** 50, 787-795 (2017).
2. C. Ma, Y. Cheng, J. Sakamoto, Nancy Dudney, M. Chi**,** "Li-metal/Solid Electrolyte Interfacial Stability Elucidated via *in situ* Electron Microscopy," ***Nano Lett***, 16 (11), 7030-7036 (2016).
3. K. Yin, M. Zhang, Z. Hood, S. Meng, M. Chi, "Self-Assembled Framework Formed during Lithiation of SnS_2 Nanoplates Revealed by In Situ Electron Microscopy," ***Acc. Chem. Res.,*** 50 (7), 1513–1520 (2017).
4. K. C. Alexander, P. Ganesh, M. Chi, P. Kent, B. G. Sumpter, "Grain boundary stability and influence on ionic conductivity in a disordered perovskite—a first-principles investigation of lithium lanthanum titanate," ***MRS Communications*** 6, 455-463 (2016).
5. L. Li, A. Tirado, B. S. Conner, M. Chi, A. M. Elliott, O. Rios, H. Zhou, M. P. Paranthaman, "A novel method combining additive manufacturing and alloy infiltration for NdFeB bonded magnet fabrication," ***Journal of Magnetism and Magnetic Materials*** 438, 163-167 (2017).
6. J. Pokrzywinski, J. Keum, R. E. Ruther, E. C. Self, M. Chi, H. Meyer, K. C. Littrell, D. Aulakh, S. Marble, J. Ding, "Unrivaled Combination of Surface Area and Pore Volume in MicelleTemplated Carbon for Supercapacitor Energy Storage," ***Journal of Materials Chemistry A*** (2017).
7. Y. Song, R. Peng, D. K. Hensley, P. V. Bonnesen, L. Liang, Z. Wu, H. M. Meyer, M. Chi, C. Ma, B. G. Sumpter, "High-Selectivity Electrochemical Conversion of CO2 to Ethanol using a Copper Nanoparticle/N-Doped Graphene Electrode," ***ChemistrySelect*** 1, 6055-6061 (2016).
8. X.-G. Sun, S. Wan, H. Y. Guan, Y. Fang, K. S. Reeves, M. Chi, S. Dai, "Correction: New promising lithium malonatoborate salts for high voltage lithium ion batteries," ***Journal of Materials Chemistry A*** 5, 6756-6756 (2017).
9. M. Vara, L. T. Roling, X. Wang, A. O. Elnabawy, Z. D. Hood, M. Chi, M. Mavrikakis, Y. Xia, "Understanding the Thermal Stability of Palladium-Platinum Core-Shell Nanocrystals by In Situ Transmission Electron Microscopy and Density Functional Theory," ***ACS nano*** (2017).
10. L. Wang, Z. Zeng, C. Ma, Y. Liu, M. Giroux, M. Chi, J. Jin, J. Greeley, C. Wang, "Plating Precious Metals on Nonprecious Metal Nanoparticles for Sustainable Electrocatalysts," ***Nano Letters*** (2017).
11. X. Wang, M. Luo, H. Huang, M. Chi, J. Howe, Z. Xie, Y. Xia, "Facile Synthesis of Pt–Pd Alloy Nanocages and Pt Nanorings by Templating with Pd Nanoplates," ***ChemNanoMat*** 2, 1086-1091 (2016).
12. Z. Xi, A. Mendoza-Garcia, H. Zhu, M. Chi, D. Su, D. P. Erdosy, J. Li, S. Sun, "Ni x WO 2.72 nanorods as an efficient electrocatalyst for oxygen evolution reaction," ***Green Energy & Environment*** 2, 119-123 (2017).
13. M. Yang, Z. D. Hood, X. Yang, M. Chi, Y. Xia, "Facile synthesis of Ag@ Au core–sheath nanowires with greatly improved stability against oxidation," ***Chemical Communications*** 53, 1965-1968 (2017).
14. M. Zhao, L. Figueroa-Cosme, A. Elnabawy, M. I. Vara, X. Yang, L. Roling, M. Chi, Y. Xia, M. Mavrikakis, "Synthesis and Characterization of Ru Cubic Nanocages with a Face-Centered-Cubic (fcc) Structure by Templating with Pd Nanocubes," ***Nano Lett*** (2016).
15. C. Ma, Y. Cheng, K. Chen, J. Li, B. G. Sumpter, C. W. Nan, K. L. More, N. J. Dudney, M. Chi*, "Mesoscopic Framework Enables Facile Ionic Transport in Solid Electrolytes for Li Batteries," ***Adv Energy Mater*** 6, (2016).
16. M. Vara, M. Chi, Y. Xia, "Facile Synthesis of BaTiO3 Nanocubes with the Use of Anatase TiO2 Nanorods as a Precursor to Titanium Hydroxide," ***ChemNanoMat*** (2016).
17. X. Sang, A. R. Lupini, R. R. Unocic, M. Chi, A. Y. Borisevich, S. V. Kalinin, E. Endeve, R. K. Archibald, S. Jesse, "Dynamic scan control in STEM: spiral scans," ***Advanced Structural and Chemical Imaging*** 2, 1 (2016).
18. D. Raciti, J. Kubal, C. Ma, M. Barclay, M. Gonzalez, M. F. Chi, J. Greeley, K. L. More, C. Wang, "Pt3Re alloy nanoparticles as electrocatalysts for the oxygen reduction reaction," ***Nano Energy*** 20, 202-211 (Feb, 2016).
19. C. Ma, M. Chi, "Novel solid electrolytes for Li-ion batteries: a perspective from electron microscopy studies," ***Frontiers in Energy Research*** 4, 23 (2016).
20. R. Lupini, M. Chi, S. Jesse, "Rapid aberration measurement with pixelated detectors," ***J Microsc-Oxford*** 263, 43-50 (Jul, 2016).
21. H. L. Wang, G. D. Niu, M. Zhou, X. Wang, J. H. Park, S. X. Bao, M. F. Chi, Z. S. Cai, Y. N. Xia, "Scalable Synthesis of Palladium Icosahedra in Plug Reactors for the Production of Oxygen Reduction Reaction Catalysts," ***Chemcatchem*** 8, 1658-1664 (May 9, 2016).
22. H. Wang, G. Niu, M. Zhou, X. Wang, J. Park, S. Bao, M. Chi, Z. Cai, Y. Xia, "Scalable Synthesis of Palladium Icosahedra in Plug Reactors for the Production of Oxygen Reduction Reaction Catalysts," ***Chemcatchem*** 8, 1658-1664 (2016).

23. Y. C. Li, M. P. Paranthaman, L. W. Gill, E. W. Hagaman, Y. Y. Wang, A. P. Sokolov, S. Dai, C. Ma, M. F. Chi, G. M. Veith, A. Manthiram, J. B. Goodenough, "Conduction below 100 degrees C in nominal Li6ZnNb4O14," ***J Mater Sci*** 51, 854-860 (Jan, 2016).
24. X. Li, M.-W. Lin, J. Lin, B. Huang, A. A. Puretzky, C. Ma, K. Wang, W. Zhou, S. T. Pantelides, M. Chi, "Two-dimensional GaSe/MoSe2 misfit bilayer heterojunctions by van der Waals epitaxy," ***Science advances*** 2, e1501882 (2016).
25. L. Li, D. Parker, M. Chi, G. M. Tsoi, Y. K. Vohra, A. S. Sefat, "Metallicity of Ca 2 Cu 6 P 5 with single and double copper-pnictide layers," ***J Alloy Compd*** 671, 334-339 (2016).
26. S. Jesse, M. Chi, A. Belianinov, C. Beekman, S. Kalinin, A. Borisevich, A. Lupini, "Big Data Analytics for Scanning Transmission Electron Microscopy Ptychography," ***Sci Rep-Uk*** 6, (2016).
27. S. I. Choi, S. R. Lee, C. Ma, B. Oliy, M. Luo, M. Chi, Y. Xia, "Facile Synthesis of Rhodium Icosahedra with Controlled Sizes up to 12 nm," ***ChemNanoMat*** 2, 61-66 (2016).
28. W. C. Barnhill, H. Luo, H. M. Meyer, C. Ma, M. Chi, B. L. Papke, J. Qu, "Tertiary and Quaternary Ammonium-Phosphate Ionic Liquids as Lubricant Additives," ***Tribology Letters*** 63, 1-11 (2016).
29. L. Zhang, L. T. Roling, X. Wang, M. Vara, M. F. Chi, J. Y. Liu, S. I. Choi, J. Park, J. A. Herron, Z. X. Xie, M. Mavrikakis, Y. N. Xia, "Platinum-based nanocages with subnanometer-thick walls and well-defined, controllable facets," ***Science*** 349, 412-416 (Jul 24, 2015).
30. Y. Wu, C. Ma, J. H. Yang, Z. C. Li, L. F. Allard, C. D. Liang, M. F. Chi, "Probing the initiation of voltage decay in Li-rich layered cathode materials at the atomic scale," ***Journal of Materials Chemistry A*** 3, 5385-5391 (Mar 14, 2015).
31. X. Wang, S. I. Choi, L. T. Roling, M. Luo, C. Ma, L. Zhang, M. F. Chi, J. Y. Liu, Z. X. Xie, J. A. Herron, M. Mavrikakis, Y. N. Xia, "Palladium-platinum core-shell icosahedra with substantially enhanced activity and durability towards oxygen reduction," ***Nat Commun*** 6, (Jul, 2015).
32. W. S. Wang, Y. F. Ye, J. Feng, M. F. Chi, J. H. Guo, Y. D. Yin, "Enhanced Photoreversible Color Switching of Redox Dyes Catalyzed by Barium-Doped TiO2 Nanocrystals," ***Angew Chem Int Edit*** 54, 1321-1326 (Jan 19, 2015).
33. H. Wang, C. Ma, M. Chi, C. Liang, "High-Performance Lithium Solid-State Batteries Operating at Elevated Temperature," ***Advanced Materials Interfaces*** 2, (2015).
34. D. N. Qian, C. Ma, K. L. More, Y. S. Meng, M. F. Chi, "Advanced analytical electron microscopy for lithium-ion batteries," ***Npg Asia Mater*** 7, (Jun, 2015).
35. C. Ma, E. Rangasamy, C. D. Liang, J. Sakamoto, K. L. More, M. F. Chi, "Excellent Stability of a Lithium-Ion-Conducting Solid Electrolyte upon Reversible Li+/H+ Exchange in Aqueous Solutions," ***Angew Chem Int Edit*** 54, 129-133 (Jan 2, 2015).
36. H. Liu, D. Qian, M. G. Verde, M. Zhang, L. Baggetto, K. An, Y. Chen, K. J. Carroll, D. Lau, M. Chi, "Understanding the Role of NH4F and Al2O3 Surface Co-modification on Lithium-Excess Layered Oxide Li1. 2Ni0. 2Mn0. 6O2," ***Acs Appl Mater Inter*** 7, 19189-19200 (2015).
37. X. F. Li, L. Basile, M. Yoon, C. Ma, A. A. Puretzky, J. Lee, J. C. Idrobo, M. F. Chi, C. M. Rouleau, D. B. Geohegan, K. Xiao, "Revealing the Preferred Interlayer Orientations and Stackings of Two-Dimensional Bilayer Gallium Selenide Crystals," ***Angew Chem Int Edit*** 54, 2712-2717 (Feb 23, 2015).
38. J. C. Li, C. Ma, M. F. Chi, C. D. Liang, N. J. Dudney, "Solid Electrolyte: the Key for High-Voltage Lithium Batteries," ***Adv Energy Mater*** 5, (Feb 18, 2015).
39. J. K. Kim, B. Senthilkumar, S. H. Sahgong, J. H. Kim, M. F. Chi, Y. Kim, "New Chemical Route for the Synthesis of beta-Na0.33V2O5 and Its Fully Reversible Li Intercalation," ***Acs Appl Mater Inter*** 7, 7025-7032 (Apr 1, 2015).
40. B. H. Han, D. N. Qian, M. Risch, H. L. Chen, M. F. Chi, Y. S. Meng, Y. Shao-Horn, "Role of LiCoO2 Surface Terminations in Oxygen Reduction and Evolution Kinetics," ***J Phys Chem Lett*** 6, 1357-1362 (Apr 16, 2015).
41. H. Dixit, C. Beekman, C. M. Schlepütz, W. Siemons, Y. Yang, N. Senabulya, R. Clarke, M. Chi, H. M. Christen, V. R. Cooper, "Understanding Strain-Induced Phase Transformations in BiFeO3 Thin Films," ***Advanced Science*** 2, (2015).
42. M. Chi, C. Wang, Y. Lei, G. Wang, D. Li, K. L. More, A. Lupini, L. F. Allard, N. M. Markovic, V. R. Stamenkovic, "Surface faceting and elemental diffusion behaviour at atomic scale for alloy nanoparticles during in situ annealing," ***Nat Commun*** 6, (2015).
43. H. Yang, P. G. Kotula, Y. Sato, M. Chi, Y. Ikuhara, N. D. Browning, "Segregation of Mn2+ Dopants as Interstitials in SrTiO3 Grain Boundaries," ***Materials Research Letters*** 2, 16-22 (2014).
44. Y. Wang, S. I. Choi, X. Zhao, S. Xie, H. C. Peng, M. Chi, C. Z. Huang, Y. Xia, "Polyol Synthesis of Ultrathin Pd Nanowires via Attachment-Based Growth and Their Enhanced Activity towards Formic Acid Oxidation," ***Adv Funct Mater*** 24, 131-139 (2014).
45. N. Shin, M. F. Chi, M. A. Filler, "Interplay between Defect Propagation and Surface Hydrogen in Silicon Nanowire Kinking Superstructures," ***Acs Nano*** 8, 3829-3835 (Apr, 2014).

46. J. Qu, H. Luo, M. Chi, C. Ma, P. J. Blau, S. Dai, M. B. Viola, "Comparison of an oil-miscible ionic liquid and ZDDP as a lubricant anti-wear additive," ***Tribol Int*** 71, 88-97 (2014).
47. Z. A. Qiao, P. F. Zhang, S. H. Chai, M. F. Chi, G. M. Veith, N. C. Gallego, M. Kidder, S. Dai, "Lab-in-a-Shell: Encapsulating Metal Clusters for Size Sieving Catalysis," ***J Am Chem Soc*** 136, 11260-11263 (Aug 13, 2014).
48. D. Qian, B. Xu, M. Chi, Y. S. Meng, "Uncovering the roles of oxygen vacancy on cation migration in lithium excess layered oxides," ***Phys Chem Chem Phys*** (2014).
49. K. Naskar, Z. H. Bi, Y. C. Li, S. K. Akato, D. Saha, M. F. Chi, C. A. Bridges, M. P. Paranthaman, "Tailored recovery of carbons from waste tires for enhanced performance as anodes in lithium-ion batteries," ***Rsc Adv*** 4, 38213-38221 (2014).
50. Ma, K. Chen, C. D. Liang, C. W. Nan, R. Ishikawa, K. More, M. F. Chi, "Atomic-scale origin of the large grain-boundary resistance in perovskite Li-ion-conducting solid electrolytes," ***Energ Environ Sci*** 7, 1638-1642 (May, 2014).
51. X. F. Li, M. W. Lin, A. A. Puretzky, J. C. Idrobo, C. Ma, M. F. Chi, M. Yoon, C. M. Rouleau, I. I. Kravchenko, D. B. Geohegan, K. Xiao, "Controlled Vapor Phase Growth of Single Crystalline, Two-Dimensional GaSe Crystals with High Photoresponse," ***Sci Rep-Uk*** 4, (Jun 30, 2014).
52. D. G. Li, C. Wang, D. S. Strmcnik, D. V. Tripkovic, X. L. Sun, Y. J. Kang, M. F. Chi, J. D. Snyder, D. van der Vliet, Y. F. Tsai, V. R. Stamenkovic, S. H. Sun, N. M. Markovic, "Functional links between Pt single crystal morphology and nanoparticles with different size and shape: the oxygen reduction reaction case," ***Energ Environ Sci*** 7, 4061-4069 (2014).
53. J. H. Kim, A. Huq, M. F. Chi, N. P. W. Pieczonka, E. Lee, C. A. Bridges, M. M. Tessema, A. Manthiram, K. A. Persson, B. R. Powell, "Integrated Nano-Domains of Disordered and Ordered Spinel Phases in LiNi0.5Mn1.5O4 for Li-Ion Batteries," ***Chem Mater*** 26, 4377-4386 (Aug 12, 2014).
54. Y. J. Kang, J. Snyder, M. F. Chi, D. G. Li, K. L. More, N. M. Markovic, V. R. Stamenkovic, "Multimetallic Core/Interlayer/Shell Nanostructures as Advanced Electrocatalysts," ***Nano Lett*** 14, 6361-6367 (Nov, 2014).
55. B. K. Guo, X. Q. Yu, X. G. Sun, M. F. Chi, Z. A. Qiao, J. Liu, Y. S. Hu, X. Q. Yang, J. B. Goodenough, S. Dai, "A long-life lithium-ion battery with a highly porous TiNb2O7 anode for large-scale electrical energy storage," ***Energ Environ Sci*** 7, 2220-2226 (Jul, 2014).
56. C. B. Gao, Y. X. Hu, M. S. Wang, M. F. Chi, Y. D. Yin, "Fully Alloyed Ag/Au Nanospheres: Combining the Plasmonic Property of Ag with the Stability of Au," ***J Am Chem Soc*** 136, 7474-7479 (May 21, 2014).
57. H. H. Elsentriecy, J. Qu, H. M. Luo, H. M. Meyer, C. Ma, M. F. Chi, "Improving corrosion resistance of AZ31B magnesium alloy via a conversion coating produced by a protic ammonium-phosphate ionic liquid," ***Thin Solid Films*** 568, 44-51 (Oct 1, 2014).
58. C. Chen, Y. J. Kang, Z. Y. Huo, Z. W. Zhu, W. Y. Huang, H. L. L. Xin, J. D. Snyder, D. G. Li, J. A. Herron, M. Mavrikakis, M. F. Chi, K. L. More, Y. D. Li, N. M. Markovic, G. A. Somorjai *et al.*, "Highly Crystalline Multimetallic Nanoframes with Three-Dimensional Electrocatalytic Surfaces," ***Science*** 343, 1339-1343 (Mar 21, 2014).
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