

Ju Li

Employment *Massachusetts Institute of Technology* Cambridge, MA 02139
Battelle Energy Alliance Professor of Nuclear Science and Engineering,
Full Professor (7/2011-present), Department of Nuclear Science and Engineering
and Department of Materials Science and Engineering

University of Pennsylvania Philadelphia, PA 19104
Associate Professor of Materials Science and Engineering (9/2007-6/2011)

Ohio State University Columbus, OH 43210
Assistant Professor of Materials Science and Engineering (9/2002-9/2007)

Massachusetts Institute of Technology Cambridge, MA 02139
Research scientist (4/2002-9/2002), postdoctoral associate (9/2000-4/2002)
Departments of Nuclear Engineering and Materials Science and Engineering

Education *Massachusetts Institute of Technology* Cambridge, MA 02139
Department of Nuclear Engineering (1994-2000) Ph.D., Sept. 2000

University of Science and Technology of China Hefei, Anhui 230026, P.R.C.
Special Class for Gifted Young (1990-1994) B.S. in Physics, 1994

Honors & Awards Fellow of the Materials Research Society (2017)

Fellow of the American Physical Society (2014)

Thomson Reuters *Highly Cited Researchers* 2014, among 147 scientists world-
wide in *Materials Science* category based on papers published between 2002-2012,
and among “*The World’s Most Influential Scientific Minds 2014*”

Lee Hsun Young Scientist Lecture Series on Materials Science, Institute of Metal
Research, Chinese Academy of Sciences (2011)

Chinese Ministry of Education and Li Ka Shing Foundation Chang Jiang Scholar
Award (2009)

TMS Robert Lansing Hardy Award (2009)

Technology Review TR35 award (2007)

National Academy of Engineering U.S. Frontiers of Engineering Symposium (Mi-
crosoft Research, Sept. 2007) and German-American Frontiers of Engineering
Symposium (Oak Ridge, April 2010) co-sponsored by the Alexander von Hum-
boldt Foundation.

Materials Research Society (MRS) 2006 Outstanding Young Investigator Award

Ohio State University College of Engineering Lumley Research Award 2006
Presidential Early Career Award for Scientists and Engineers (PECASE) 2005
Materials Research Society (MRS) Graduate Student Silver Medalist 1998
MIT Nuclear Engineering Department Manson Benedict Fellowship 1996-1997

Service

Author of free molecular visualization software *AtomEye*:
<http://www.google.com/search?q=AtomEye>

Member of Editorial Board of *Nano Research* (Mar. 2008-), *Modelling and Simulation in Materials Science and Engineering* (Feb. 2008-), *Science China: Technological Sciences* (Jan. 2013-), *Extreme Mechanics Letters* (Aug. 2014-).

3-Member Executive Board (Oct. 2010-present) and International Advisory Board (Aug. 2009-present) of Multiscale Materials Modeling (MMM) conference series.

Lead Organizer of 2013 MRS Fall Meeting Symposium YY “*Elastic Strain Engineering for Unprecedented Materials Properties*”, and Lead Guest Editor of *MRS Bulletin* February 2014 special issue on Elastic Strain Engineering

Author of multiple perspective articles in *MRS Bulletin*

Issued Patents

2. Mar 14, 2017, US Patent 9595624 “Strain-engineered bandgaps,” Ju Li, Xiaofeng Qian, Ji Feng.
1. Nov.1, 2016: US Patent 9484489 “Engineered band gaps”, Ju Li, Xiaofeng Qian, Menghao Wu.

Representative Publications (300 peer-reviewed papers, 17,000+ SCI cites, h-index 69)¹

121. G-Y. Xu, A. Kushima, J-R. Yuan, H. Dou, W-J. Xue, X-G. Zhang, X-H. Yan and J. Li, “Ad hoc Solid Electrolyte on Acidized Carbon Nanotube Paper Improves Cycle Life of Lithium-Sulfur Batteries,” *Energy & Environmental Science* **10** (2017) 2544-2551.
120. L-M. Suo, D. Oh, Y-X. Lin, Z-Q. Zhuo, O. Borodin, T. Gao, F. Wang, A. Kushima, Z-Q. Wang, H-C. Kim, Y. Qi, W-L. Yang, F. Pan, J. Li, K. Xu and C-S. Wang, “How Solid-Electrolyte Interphase Forms in Aqueous Electrolytes,” *J. Am. Chem. Soc.* **10** (2017) 18670-18680.

¹ ResearcherID: A-2993-2008 ISI Web of Knowledge search keywords: “Li J” in Author and “nucl same engn same 02139 or mat same 43210 or mat same Univ Penn or 2041 same Columbus” in Address. See also all publications ranked by Google Scholar.

119. W-J. Xue, L-X. Miao, L. Qie, C. Wang, S. Li, J-L. Wang and J. Li, "Gravimetric and volumetric energy densities of lithium-sulfur batteries," *Current Opinion in Electrochemistry* **6** (2017) 92-99.
118. S-T. Wang, W. Quan, Z. Zhu, Y. Yang, Q. Liu, Y. Ren, X-Y. Zhang, R. Xu, Y. Hong, Z-T. Zhang, K. Amine, Z-L. Tang, J. Lu and J. Li, "Lithium titanate hydrates with superfast and stable cycling in lithium ion batteries," *Nature Communications* **8** (2017) 627.
117. Y-M. Chen, X-Y. Li, K-S. Park, W. Lu, C. Wang, W-J. Xue, F. Yang, J. Zhou, L-M. Suo, T-Q. Lin, H-T. Huang, J. Li and J.B. Goodenough, "Nitrogen-Doped Carbon for Sodium-Ion Battery Anode by Self-Etching and Graphitization of Bimetallic MOF-Based Composite," *Chem* **3** (2017) 152-163.
116. S-L. Zhang, K-J. Zhao, T. Zhu and J. Li, "Electrochemomechanical degradation of high-capacity battery electrode materials," *Progress in Materials Science* **89** (2017) 479-521.
115. Y-H. Zheng, Y-S. Wang, Y-X. Lu, Y-S. Hu and J. Li, "A high-performance sodium-ion battery enhanced by macadamia shell derived hard carbon anode," *Nano Energy* **39** (2017) 489-498.
114. G-Y. Xu, Q-B. Yan, S-T. Wang, A. Kushima, P. Bai, K. Liu, X-G. Zhang, Z-L. Tang and J. Li, "A thin multifunctional coating on a separator improves the cyclability and safety of lithium sulfur batteries," *Chemical Science* **8** (2017) 6619-6625.
113. W-J. Xue, Q-B. Yan, G-Y. Xu, L-M. Suo, Y-M. Chen, C. Wang, C-A. Wang and J. Li, "Double-oxide sulfur host for advanced lithium-sulfur batteries," *Nano Energy* **38** (2017) 12-18.
112. M-J. Lee, E-S. Lho, P. Bai, S-J. Chae, J. Li and J-P. Cho, "Low-Temperature Carbon Coating of Nanosized $\text{Li}_{1.015}\text{Al}_{1.06}\text{Mn}_{1.925}\text{O}_4$ and High-Density Electrode for High-Power Li-Ion Batteries," *Nano Letters* **17** (2017) 3744-3751.
111. W-Z. Han, J. Zhang, M-S. Ding, L. Lv, W-H. Wang, G-H. Wu, Z-W. Shan and J. Li, "Helium Nanobubbles Enhance Superelasticity and Retard Shear Localization in Small-Volume Shape Memory Alloy," *Nano Letters* **17** (2017) 3725-3730.
110. B.Y. Guan, A. Kushima, L. Yu, S. Li, J. Li and X.W. Lou, "Coordination Polymers Derived General Synthesis of Multishelled Mixed Metal-Oxide Particles for Hybrid Supercapacitors," *Advanced Materials* **29** (2017) 1605902.
109. W-B. Li, L. Sun, J-S. Qi, P. Jarillo-Herrero, M. Dinca and J. Li, "High temperature ferromagnetism in pi-conjugated two-dimensional metalorganic frameworks," *Chemical Science* **8** (2017) 2859-2867.
108. K. Liu, P. Bai, M.Z. Bazant, C-A. Wang and J. Li, "A soft non-porous separator and its effectiveness in stabilizing Li metal anodes cycling at 10 mA cm⁻² observed in situ in a capillary cell," *Journal of Materials Chemistry A* **5** (2017) 4300-4307.

107. M. Li, D-G. Xie, E. Ma, J. Li, X-X. Zhang and Z-W. Shan, "Effect of hydrogen on the integrity of aluminium-oxide interface at elevated temperatures," *Nature Communications* **8** (2017) 14564.
106. Y. Jin, S. Li, A. Kushima, X-Q. Zheng, Y-M. Sun, J. Xie, J. Sun, W-J. Xue, G-M. Zhou, J. Wu, F-F. Shi, R-F. Zhang, Z. Zhu, K-P. So, Y. Cui and J. Li, "Self-healing SEI enables full-cell cycling of a silicon-majority anode with a coulombic efficiency exceeding 99.9%," *Energy & Environmental Science* **10** (2017) 580-592.
105. A. Kushima, K.P. So, C. Su, P. Bai, N. Kuriyama, T. Maebashi, Y. Fujiwara, M.Z. Bazant and J. Li, "Liquid cell transmission electron microscopy observation of lithium metal growth and dissolution: Root growth, dead lithium and lithium flotsams," *Nano Energy* **32** (2017) 271-279.
104. S-T. Wang, Y. Yang, W. Quan, Y. Hong, Z-T. Zhang, Z-L. Tang and J. Li, "Ti³⁺-free three-phase Li₄Ti₅O₁₂/TiO₂ for high-rate lithium ion batteries: Capacity and conductivity enhancement by phase boundaries," *Nano Energy* **32** (2017) 294-301.
103. Y.G. Li, Y. Yang, M.P. Short, Z.J. Ding, Z. Zeng and J. Li, "Ion radiation albedo effect: influence of surface roughness on ion implantation and sputtering of materials," *Nuclear Fusion* **57** (2017) 016038.
102. L. Yang, T. Dai, Y-C. Wang, D-G. Xie, R.L. Narayan, J. Li and X-H. Ning, "Chestnut-like SnO₂/C nanocomposites with enhanced lithium ion storage properties," *Nano Energy* **30** (2016) 885-891.
101. S-Z. Li, Q-Y. Li, R.W. Carpick, P. Gumbsch, X.Z. Liu, X-D. Ding, J. Sun and J. Li, "The evolving quality of frictional contact with graphene," *Nature* **539** (2016) 541-545.
100. D-G. Xie, S-Z. Li, M. Li, Z-J. Wang, P. Gumbsch, J. Sun, E. Ma, J. Li and Z-W. Shan, "Hydrogenated vacancies lock dislocations in aluminium," *Nature Communications* **7** (2016) 13341.
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98. X-H. Liu, J-F. Gu, Y. Shen and J. Li, "Crystal metamorphosis at stress extremes: how soft phonons turn into lattice defects," *NPG Asia Materials* **8** (2016) e320.
97. J-Y. Zhang, Y-W. Mao, D. Wang, J. Li and Y-Z. Wang, "Accelerating ferroic ageing dynamics upon cooling," *NPG Asia Materials* **8** (2016) e319.
96. Q-J. Li, J. Li, Z-W. Shan and E. Ma, "Surface Rebound of Relativistic Dislocations Directly and Efficiently Initiates Deformation Twinning," *Phys. Rev. Lett.* **117** (2016) 165501.
95. Q-J. Li, J. Li, Z-W. Shan and E. Ma, "Strongly correlated breeding of high-speed dislocations," *Acta Materialia* **119** (2016) 229-241.

94. Z-Q. Liu, Z-Y. Yin, C. Cox, M. Bosman, X-F. Qian, N. Li, H-Y. Zhao, Y-P. Du, J. Li and D.G. Nocera, "Room temperature stable CO_x-free H₂ production from methanol with magnesium oxide nanophotocatalysts," *Science Advances* **2** (2016) e1501425.
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90. K.P. So, D. Chen, A. Kushima, M-D. Li, S-T. Kim, Y. Yang, Z-Q. Wang, J.G. Park, Y.H. Lee, R.I. Gonzalez, M. Kiwi, E.M. Bringa, L. Shao and J. Li, "Dispersion of carbon nanotubes in aluminum improves radiation resistance," *Nano Energy* **22** (2016) 319-327.
89. W-B. Li and J. Li, "Ferroelasticity and domain physics in two-dimensional transition metal dichalcogenide monolayers," *Nature Communications* **7** (2016) 10843.
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85. W-B. Li and J. Li, "Piezoelectricity in two-dimensional group-III monochalcogenides," *Nano Research* **8** (2015) 3796-3802.
84. A. Kushima, T. Koido, Y. Fujiwara, N. Kuriyama, N. Kusumi and J. Li, "Charging/Discharging Nanomorphology Asymmetry and Rate-Dependent Capacity Degradation in Li-Oxygen Battery," *Nano Letters* **15** (2015) 8260-8265.
83. W. Guo, Z. Wang and J. Li, "Diffusive versus Displacive Contact Plasticity of Nanoscale Asperities: Temperature- and Velocity-Dependent Strongest Size," *Nano Letters* **15** (2015) 6582-6585.
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79. W-B. Li, J.M. Rieser, A.J. Liu, D.J. Durian and J. Li, "Deformation-driven diffusion and plastic flow in amorphous granular pillars," *Phys. Rev. E* **91** (2015) 062212.
78. X-F. Qian, L. Fu and J. Li, "Topological crystalline insulator nanomembrane with strain-tunable band gap," *Nano Research* **8** (2015) 967-979.
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76. A. Kushima, X-F. Qian, P. Zhao, S.L. Zhang and J. Li, "Ripplocations in van der Waals Layers," *Nano Letters* **15** (2015) 1302-1308.
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73. J. Li, Z-W. Shan and E. Ma, Guest Editors, "Elastic strain engineering for unprecedented materials properties," *MRS Bulletin* **39** (2014) 108-114.
72. M-H. Wu, X-F. Qian and J. Li, "Tunable Exciton Funnel Using Moire Superlattice in Twisted van der Waals Bilayer," *Nano Letters* **14** (2014) 5350-5357.
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69. P-Y. Zhao, J. Li and Y-Z. Wang, "Extended defects, ideal strength and actual strengths of finite-sized metallic glasses," *Acta Materialia* **73** (2014) 149-166.
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67. B-Y. Liu, J. Wang, B. Li, L. Lu, X-Y. Zhang, Z-W. Shan, J. Li, C-L. Jia, J. Sun and E. Ma, "Twinning-like lattice reorientation without a crystallographic twinning plane," *Nature Communications* **5** (2014) 3297.

66. J.P. Lin, X.D. Li, G.J. Qiao, Z. Wang, J. Carrete, Y. Ren, L.Z. Ma, Y.J. Fei, B.F. Yang, L. Lei and J. Li, "Unexpected High-Temperature Stability of beta-Zn₄Sb₃ Opens the Door to Enhanced Thermoelectric Performance," *J. Am. Chem. Soc.* **136** (2014) 1497-1504.
65. M. Gu, A. Kushima, Y.Y. Shao, J-G. Zhang, J. Liu, N.D. Browning, J. Li and C.M. Wang, "Probing the Failure Mechanism of SnO₂ Nanowires for Sodium-Ion Batteries," *Nano Letters* **13** (2013) 5203-5211.
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61. P.Y. Zhao, J. Li and Y.Z. Wang, "Heterogeneously randomized STZ model of metallic glasses: Softening and extreme value statistics during deformation," *Int. J. Plasticity* **40** (2013) 1-22.
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59. A. Kushima, J.Y. Huang and J. Li, "Quantitative fracture strength and plasticity measurements of lithiated silicon nanowires by in situ TEM tensile experiments," *ACS Nano* **6** (2012) 9425-9432.
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53. S-W. Nam, H-S. Chung, Y.C. Lo, L. Qi, J. Li, Y. Lu, A.T.C. Johnson, Y. Jung, P. Nukala, R. Agarwal, "Electrical Wind Force-Driven and Dislocation-Templated Amorphization in Phase-Change Nanowires," *Science* **336** (2012) 1561-1566.
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51. J.S. Qi, X.F. Qian, L. Qi, J. Feng, D.N. Shi and J. Li, "Strain-Engineering of Band Gaps in Piezoelectric Boron Nitride Nanoribbons," *Nano Letters* **12** (2012) 1224-1228.
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49. Q. Yu, L. Qi, K. Chen, R.K. Mishra, J. Li and A.M. Minor, "The Nanostructured Origin of Deformation Twinning," *Nano Letters* **12** (2012) 887-892.
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