

Jinpeng Wu



- Associate Professor, Department of Electrical Engineering, Tsinghua University
- Research Interests: Power semiconductor devices, energy and electrical materials, X-ray spectroscopies.
- Address: West Main Building #2-315, Department of Electrical Engineering, Tsinghua University, Beijing, 100084, P. R. China.
- Email: jinpengwu@tsinghua.edu.cn
- Phone: +86-10-62788811
- Personal Links: [GoogleScholar](#)

Biography

Dr. Jinpeng Wu received his Bachelor and Ph.D. degrees in Electrical Engineering from Tsinghua University in 2010 and 2015, respectively. From 2016 to 2020, he continued his research in Stanford University and Lawrence Berkeley National Lab as a Postdoctoral Researcher. Currently, he works as an Associate Professor in the Department of Electrical Engineering, Tsinghua University. His research interests include the power semiconductor devices, energy and electrical materials, and X-ray spectroscopies.

Educational Background

- 2016-2020, Collaborative Postdoc, Stanford University and Lawrence Berkeley National Lab
- 2010-2015, Ph.D. of Eng., Electrical Engineering, Tsinghua University, China
- 2006-2010, Bachelor of Eng., Electrical Engineering, Tsinghua University, China

Work Experience

- Dec, 2021-Present, Associate Professor, Department of Electrical Engineering, Tsinghua University, Beijing, China
- Dec, 2020-Dec, 2021, Assistant Professor, Department of Electrical Engineering, Tsinghua University, Beijing, China

Honors and Awards

(1) Research Award

- 2019, "ALS Collaborative Postdoc Fellowship Award" , Lawrence Berkeley National Lab, US
- 2015, "C100 Scholar" , Committee of 100, US

(2) Teaching Award

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Professional Activity

(1) Professional Society Membership

- *iEnergy* Journal Young Assistant Editor
- CIGRE WG C4.69 Member

(2) Editorship in International Journals

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(3) Editorship in Chinese Journals

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(4) Editorship For Special Issues or Sections

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(5) Chair and Technical Committee of Conference

Chair of Conference

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Member of Technical Program Committee / International Advisory Committee

- The 7th Asia-Pacific Power and Energy Engineering Conference (APPEEC 2015), April 12 to 14, 2015 in Beijing, China
- The 6th IEEE PES Asia-Pacific Power and Energy Engineering Conference (APPEEC 2014), 7-10 December, 2014, Hong Kong, China
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Research

(1) Research Interests

- Power semiconductor devices
- Energy and electrical materials
- X-ray spectroscopies

(2) Selected Academic Funds

- 2021.01-2025.12, Proton irradiation on high power electronics: Beamline, mechanisms, modeling, and application. NSFC (52177153, PI)

(3) Selected International Collaboration Projects

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(4) Selected Industry Projects

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Publications and Patents

(1) Books

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(2) Textbook

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(3) Book Chapter

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(4) Selected International Journal Papers Since 2010

- 1) **Jinpeng Wu**, Zengqing Zhuo, Xiaohui Rong, Kehua Dai, Zachary Lebens-Higgins, Shawn Sallis, Feng Pan, Louis F. J. Piper, Gao Liu, Yi-de Chuang, Zahid Hussain, Qinghao Li*, Rong Zeng*, Zhi-xun Shen*, Wanli Yang*, Capacity and Voltage Drops in Batteries with Oxygen Redox Reactions. *Science Advances*, 2020, 6(6), eaaw3871.
- 2) **Jinpeng Wu**, Jie Song, Kehua Dai, Zengqing Zhuo, Andrew L. Wray, Gao Liu, Zhi-xun Shen*, Rong Zeng*, Yuhao Lu*, Wanli Yang*, Modification of Transition-Metal Redox by Interstitial Water in Hexacyanometalate Electrodes for Sodium-Ion Batteries. *Journal of the American Chemical Society*, 2017, 139, 18358-18364.
- 3) Gi-Hyeok Lee[#], **Jinpeng Wu**[#], Duho Kim, Kyeongjae Cho, Maenghyo Cho, Wanli Yang*, Yong-Mook Kang*, Reversible Anionic Redox Activities in Conventional LiNi_{1/3}Co_{1/3}Mn_{1/3}O₂ Cathodes. *Angewandte Chemie International Edition*, 2020, 59(22), 8681-8688.
- 4) Hao Wang[#], **Jinpeng Wu**[#], Andrei Dolocan, Yutao Li, Xujie Lv, Nan Wu, Kyusung Park, Sen Xin, Lei Ming, Wanli Yang, John B. Goodenough, Short O–O separation in layered oxide Na_{0.67}CoO₂ enables an ultrafast oxygen evolution reaction. *Proceedings of the National Academy of Sciences*, 2019, 201901046.
- 5) **Jinpeng Wu**, Qinghao Li, Shawn Sallis, Zengqing Zhuo, William E. Gent, William C. Chueh, Shishen Yan, Yi-de Chuang, Wanli Yang*, Fingerprint Oxygen Redox Reactions in Batteries through High-Efficiency Mapping of Resonant Inelastic X-ray Scattering. *Condensed Matter*, 2019, 4(1).

- 6) Shuyin Xu[#], **Jinpeng Wu[#]**, Enyuan Hu, Qinghao Li, Jienan Zhang, Yi Wang, Eli Stavitski, Liwei Jiang, Xiaohui Rong, Xiqian Yu^{*}, Wanli Yang, Xiao-Qing Yang^{*}, Liquan Chen, Yong-Sheng Hu^{*}, Suppressing the voltage decay of low-cost P2-type iron-based cathode materials for sodium-ion batteries. *Journal of Materials Chemistry A*, 2018, 6(42), 20795-20803.
- 7) Dongchang Chen[#], **Jinpeng Wu[#]**, Joseph K. Papp, Bryan D. McCloskey, Wanli Yang^{*}, Guoying Chen^{*}, Role of Redox-Inactive Transition-Metals in the Behavior of Cation-Disordered Rocksalt Cathodes. *Small*, 2020, e2000656.
- 8) Zhonghao Gu, Chen Cheng, Tianran Yan, Genlin Liu, Jinsen Jiang, Jing Mao, Kehua Dai, Jiong Li, **Jinpeng Wu^{*}**, Liang Zhang^{*}, Synergistic effect of Co₃Fe₇ alloy and N-doped hollow carbon spheres with high activity and stability for high-performance lithium-sulfur batteries. *Nano Energy*, 2021, 86, 106111.
- 9) Chen Cheng, Siyuan Li, Tiefeng Liu, Yujian Xia, Lo-Yueh Chang, Yingying Yan, Manling Ding, Yue Hu, **Jinpeng Wu^{*}**, Jinghua Guo^{*}, Liang Zhang^{*}, Elucidation of anionic and cationic redox reactions in a prototype sodium layered oxide cathode. *ACS Applied Materials & Interfaces*, 2019 11, 41304-41312.
- 10) **Jinpeng Wu**, Shawn Sallis, Ruimin Qiao, Qinghao Li, Zengqing Zhuo, Kehua Dai, Zixuan Guo, Wanli Yang^{*}, Elemental-sensitive Detection of the Chemistry in Batteries through Soft X-ray Absorption Spectroscopy and Resonant Inelastic X-ray Scattering. *Journal of Visualized Experiments*, 2018, e57415.
- 11) Huiwen Ji, **Jinpeng Wu**, Zijian Cai, Jue Liu, Deok-Hwang Kwon, Hyunchul Kim, Alexander Urban, Joe Papp, Emily Foley, Yaosen Tian, Mahalingam Balasubramanian, Haegyeom Kim, Raphaelle J. Clement, Bryan D. McCloskey, Wanli Yang and Gerbrand Ceder^{*}, Ultrafast rate capability in high energy density spinel cathodes. *Nature Energy*, 2020, 5(3) 213-221.
- 12) Kehua Dai, **Jinpeng Wu**, Zengqing Zhuo, Qinghao Li, Shawn Sallis, Jing Mao, Guo Ai, Chihang Sun, Zaiyuan Li, William E. Gent, William C. Chueh, Yi-de Chuang, Rong Zeng, Zhi-xun Shen, Feng Pan, Shishen Yan, Louis F. J. Piper, Zahid Hussain, Gao Liu^{*}, Wanli Yang^{*}, High Reversibility of Lattice Oxygen Redox Quantified by Direct Bulk Probes of Both Anionic and Cationic Redox Reactions. *Joule*, 2019, 3, 518-541.
- 13) Jun-Yu Piao, Xiao-Chan Liu, **Jinpeng Wu**, Wanli Yang, Zengxi Wei, Jianmin Ma, Shu-Yi Duan, Xi-Jie Lin, Yan-Song Xu, An-Min Cao^{*}, Li-Jun Wan^{*}, Construction of Uniform Cobalt-Based Nanoshells and Its Potential for Improving Li-Ion Battery Performance. *ACS Applied Materials & Interfaces*, 2018, 10, 22896-22901.
- 14) Le Wang, Zhenzhong Yang, **Jinpeng Wu**, Mark E. Bowden, Wanli Yang, Amy Qiao, Yingge Du^{*}, Time- and strain-dependent nanoscale structural degradation in phase change epitaxial strontium ferrite films. *npj Materials Degradation*, 2020, 4.
- 15) Zachary W. Lebens-Higgins, Julija Vinckeviciute, **Jinpeng Wu**, Nicholas V. Faenza, Yixuan Li, Shawn Sallis, Nathalie Pereira, Ying Shirley Meng, Glenn G. Amatucci, Anton Van Der Ven, Wanli Yang^{*}, and Louis F. J. Piper^{*}, Distinction Between Intrinsic and X-ray Induced Oxidized Oxygen States in Li-Rich 3d Layered Oxides and LiAlO₂. *Journal of Physical Chemistry C*, 2019, 123(21), 13201-13207.
- 16) Abhishek Parija, Joseph V. Handy, Justin L. Andrews, **Jinpeng Wu**, Linda Wangoh, Sujay Singh, Chris Jozwiak, Aaron Bostwick, Eli Rotenberg, Wanli Yang, Sirine C. Fakra, Mohammed Al-Hashimi, G. Sambandamurthy, Louis F. J. Piper, R. Stanley Williams^{*}, David Prendergast^{*}, Sarbajit Banerjee^{*}, Metal-Insulator Transitions in β'-Cu V₂O₅ Mediated by Polaron Oscillation and Cation Shuttling. *Matter*, 2020, 2(5), 1166-1186.
- 17) Yun Li, Shanyu Wang, James R. Salvador, **Jinpeng Wu**, Bo Liu, Wanli Yang, Jiong Yang, Wenqing Zhang, Jun Liu, Jihui Yang^{*}, Reaction Mechanisms for Long-Life Rechargeable Zn/MnO₂ Batteries. *Chemistry of Materials*, 2019, 31, 2036-2047.

- 18) Donggun Eum, Byunghoon Kim, Sung Joo Kim, Hyeokjun Park, **Jinpeng Wu**, Sung-Pyo Cho, Gabin Yoon, Myeong Hwan Lee, Sung-Kyun Jung, Wanli Yang, Won Mo Seong, Kyojin Ku, Orapa Tamwattana, Sung Kwan Park, Insang Hwang, Kisuk Kang*, Voltage decay and redox asymmetry mitigation by reversible cation migration in lithium-rich layered oxide electrodes. **Nature Materials**, 2020, 19, 419-427.
- 19) Zengqing Zhuo, Kehua Dai, Ruimin Qiao, Rui Wang, **Jinpeng Wu**, Yali Liu, Jiayue Peng, Liquan Chen, Feng Pan, Zhi-xun Shen, Gao Liu, Hong Li, Thomas P Devereaux, Wanli Yang*, Cycling mechanism of Li₂MnO₃: Li-CO₂ batteries and commonality on oxygen redox in cathode materials. **Joule**, 2021, 5 (4), 975-997.
- 20) Jue Wu, Xiaofeng Zhang, Shiyao Zheng, Haodong Liu, **Jinpeng Wu**, Riqiang Fu, Yixiao Li, Yuxuan Xiang, Rui Liu, Wenhua Zuo, Zehao Cui, Qihui Wu, Shunqing Wu, Zonghai Chen, Ping Liu, Wanli Yang*, Yong Yang*, Tuning Oxygen Redox Reaction through the Inductive Effect with Proton Insertion in Li-Rich Oxides. **ACS Applied Materials & Interfaces**, 2020, 12, 7277-7284.
- 21) Jun-Yu Piao, Lin Gu, Zengxi Wei, Jianmin Ma, **Jinpeng Wu**, Wanli Yang, Yue Gong, Yong-Gang Sun, Shu-Yi Duan, Xian-Sen Tao, De-Shan Bin, Anmin Cao*, Li-Jun Wan, Phase Control on Surface for the Stabilization of High Energy Cathode Materials of Lithium Ion Batteries. **Journal of the American Chemical Society**, 2019, 141, 4900-4907.
- 22) Satyanarayana Emani, Caihong Liu, Maziar Ashuri, Karan Sahni, **Jinpeng Wu**, Wanli Yang, Károly Németh, Leon L. Shaw*, Li₃BN₂ as a Transition Metal Free, High Capacity Cathode for Li-ion Batteries. **ChemElectroChem**, 2019, 6, 320-325.
- 23) Umanga De Silva, Jennifer See, Wipula PR Liyanage, Jahangir Masud, **Jinpeng Wu**, Wanli Yang, Wei-Ting Chen, David Prendergast, Manashi Nath, Understanding the Structural Evolution of a Nickel Chalcogenide Electrocatalyst Surface for Water Oxidation. **Energy & Fuels**, 2021, 35(5), 4387-4403.
- 24) Xiaohui Rong, Jue Liu, Enyuan Hu, Yijin Liu, Yi Wang, **Jinpeng Wu**, Xiqian Yu*, Katharine Page, Yong-Sheng Hu*, Wanli Yang, Hong Li, Xiao-Qing Yang, Liquan Chen, Xuejie Huang, Structure-Induced Reversible Anionic Redox Activity in Na Layered Oxide Cathode. **Joule**, 2017, 2, 1-16.
- 25) Ruoqian Lin, Enyuan Hu, Mingjie Liu, Yi Wang, Hao Cheng, **Jinpeng Wu**, Jin-Cheng Zheng, Qin Wu, Seongmin Bak, Xiao Tong, Rui Zhang, Wanli Yang, Kristin Persson, Xiqian Yu*, Xiao-Qing Yang*, and Huolin Xin*, Anomalous metal segregation observed in lithium-rich layered oxide provides theoretical concept and practical design rule for stable cathode in lithium-ion battery. **Nature Communications**, 2019, 10(1), 1650.
- 26) Qi Li, Yu Qiao, Shaohua Guo, Kezhu Jiang, Qinghua Li, **Jinpeng Wu**, Haoshen Zhou*, Both Cationic and Anionic Co-(de)intercalation into a Metal-Oxide Material. **Joule**, 2018, 2, 1134-1145.
- 27) Jihyun Hong, William E. Gent, Penghao Xiao, Kipil Lim, Dong-Hwa Seo, **Jinpeng Wu**, Peter M. Csernica, Christopher J. Takacs, Dennis Nordlund, Cheng-Jun Sun, Kevin H. Stone, Donata Passarello, Wanli Yang, David Prendergast, Gerbrand Ceder*, Michael F. Toney*, William C. Chueh*, Metal-Oxygen Decoordination Stabilizes Anion Redox in Li-rich Oxides. **Nature Materials**, 2019, 18, 256-265.
- 28) Xiaoqiang Shan, Fenghua Guo, Daniel S. Charles, Zachary Lebens-Higgins, Sara Abdel Razek, **Jinpeng Wu**, Wenqian Xu, Wanli Yang, Katharine L. Page, Joerg C. Neufeind, Mikhail Feygenson, Louis F.J. Piper, Xiaowei Teng*, Structural water and disordered structure promote aqueous sodium-ion energy storage in sodium-birnessite. **Nature Communications**, 2019, 10, 4975.
- 29) Qing Wang, Sathiya Mariyappan, Gwenaëlle Rousse, Anatolii V Morozov, Benjamin Porcheron, Rémi Dedryvère, **Jinpeng Wu**, Wanli Yang, Leiting Zhang, Mohamed Chakir, Maxim Avdeev, Michaël Deschamps, Young-Sang Yu, Jordi Cabana, Marie-Liesse Doublet, Artem M Abakumov,

- Jean-Marie Tarascon, Unlocking anionic redox activity in O3-type sodium 3d layered oxides via Li substitution. *Nature Materials*, 2021, 20 (3), 353-361.
- 30) Haowei He, A. X. Gray, P. Granitzka, J. W. Jeong, N. P. Aetukuri, R. Kukreja, L. Miao, S. A. Breitweiser, *Jinpeng Wu*, Y. B. Huang, P. Olalde-Velasco, J. Pelliciari, W. F. Schlotter, E. Arenholz, T. Schmitt, M. G. Samant, S. S. P. Parkin, H. A. Dürr, Andrew L. Wray*, Measurement of collective excitations in VO₂ by resonant inelastic x-ray scattering. *Physical Review B*, 2016, 94, 161119.
 - 31) Z. Zhuo, C. D. Pemmaraju, J. Vinson, C. Jia, B. Moritz, I. Lee, S. Sallies, Q. Li, *Jinpeng Wu*, K. Dai, Y. D. Chuang, Z. Hussain, F. Pan*, T. P. Devereaux*, W. Yang*, Spectroscopic Signature of Oxidized Oxygen States in Peroxides. *Journal of Physical Chemistry Letters*, 2018, 6378-6384.
 - 32) L. Zhao, Y. Zhang, L. B. Huang, X. Z. Liu, Q. H. Zhang, C. He, Z. Y. Wu, L. J. Zhang, *Jinpeng Wu*, W. Yang, L. Gu, J. S. Hu*, L. J. Wan, Cascade anchoring strategy for general mass production of high-loading single-atomic metal-nitrogen catalysts. *Nature Communications*, 2019, 10, 1278.
 - 33) Qin-Chao Wang, Jing-Ke Meng, Xin-Yang Yue, Qi-Qi Qiu, Yun Song, Xiao-Jing Wu, Zheng-Wen Fu, Yong-Yao Xia, Zulipiya Shadik, *Jinpeng Wu*, Xiao-Qing Yang, Yong-Ning Zhou*, Tuning P2-Structured Cathode Material by Na-Site Mg Substitution for Na-Ion Batteries. *Journal of the American Chemical Society*, 2019, 141, 840-848.
 - 34) Ruoqian Lin, Seong-Min Bak, Youngho Shin, Rui Zhang, Chunyang Wang, Kim Kisslinger, Mingyuan Ge, Xiaojing Huang, Zulipiya Shadik, Ajith Pattammattel, Hanfei Yan, Yong Chu, *Jinpeng Wu*, Wanli Yang, M. Stanley Whittingham, Huolin L. Xin & Xiao-Qing Yang, Hierarchical nickel valence gradient stabilizes high-nickel content layered cathode materials. *Nature Communications*, 2021, 12 (1), 1-10.
 - 35) *Jinpeng Wu*, Jinliang He, Bo Zhang, Rong Zeng, Influence of Grounding Impedance Model on Lightning Protection Analysis of Transmission System. *Electric Power Systems Research*, Oct. 2016, vol. 139, pp. 133-138.
 - 36) *Jinpeng Wu*, Bo Zhang, Jinliang He, Rong Zeng, A Comprehensive Approach for Transient Performance of Grounding System in the Time-Domain. *IEEE Transactions on Electromagnetic Compatibility*, Apr. 2015, vol. 57, pp. 250-256.
 - 37) *Jinpeng Wu*, Bo Zhang, Jinliang He, Rong Zeng, Optimal design of tower footing device with combined vertical and horizontal grounding electrodes under lightning. *Electric Power Systems Research*, Aug 2014, vol. 113, pp. 188-195.
 - 38) Bo Zhang, *Jinpeng Wu*, Jinliang He, Rong Zeng, Analysis of Transient Performance of Grounding System Considering Soil Ionization by Time Domain Method. *IEEE Transactions on Magnetics*, May 2013, vol. 49, no. 5, pp. 1837-1840.
 - 39) Jinliang He, *Jinpeng Wu*, Bo Zhang, Rong Zeng, Fault Current Division Factor of Substation Grounding Grid in Seasonal Frozen Soil. *IEEE Transactions on Power Delivery*, April 2013, vol. 28, no. 2, pp. 855-865.
 - 40) Bo Zhang, Sen Wang, *Jinpeng Wu*, Effect of Soil Moisture on Arc Discharge in Sandy Soils Under Lightning Struck. *IEEE Letters on Electromagnetic Compatibility Practice and Applications*, 2020.
 - 41) Bo Zhang, Yukuan Jiang, *Jinpeng Wu*, Jinliang He, Influence of Potential Difference within Large Grounding Grid on Fault Current Division Factor. *IEEE Transactions on Power Delivery*, Aug. 2014, vol. 29, no.4, pp. 1752-1759.
 - 42) Bo Zhang, Jinliang He, Rong Zeng, *Jinpeng Wu*, Effect of Coke Bed on the Electrical Performance of HVDC Ground Electrode. *IEEE Transactions on Industry Applications*, Nov.-Dec. 2016, vol. 52, no. 6, pp. 4594-4600.

(5) Selected Conference Papers Since 2010

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(6) Selected Chinese Journal Papers since 2010

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(7) Authorized Patent

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(8) Computer Software Copyright

Teaching

(1) Undergraduates Courses

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(2) Postgraduates Courses

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Graduate Advising

(1) Graduated Students

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(2) Current Graduate Students

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(3) Awards of the Students

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