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Research interest

Energy: batteries, catalysts, supercapacitors, hydrogen storage
Environment: batteries recycling technology
Nanotechnology

H-Index (Google Scholar): 169

Professional Appointments

2022- Present	Chair Professor, Zhejiang University
2016- 2022	Senior Scientist, Argonne National Laboratory
2014 - 2016	July 2016, Assistant Chemist, Argonne National Laboratory
2013 - 2014	Postdoc Researcher, Argonne National Laboratory
2011 - 2013	DOE EERE Postdoctoral Research Fellow
2010 - 2011	Postdoc Researcher, Argonne National Laboratory
2009 - 2010	Research Associate (Joint), Argonne National Laboratory and Northern Illinois University

Education

Graduate: Ph.D in Metallurgical Engineering, Department of Material Science, University of Utah, 2008.
Undergraduate: B.S. in Physical Chemistry, Department of chemical physics, University of Science and Technology of China, 2000.

Awards and Recognition

2025 The 2025 Nano Energy Awards Winners
2024 Golden Banyan Award, *Carbon Energy*, Wiley
2022 Top Talent Project under the Zhejiang Provincial Program
2022 National Program for Overseas High-Level Talents
2022 International Battery Materials Association (IBA) Research Award
2022 ECS Battery Division Technology Award
2022 Research Excellence Award in Electrochemical Energy Storage (EES Award), ACS Energy & Fuel (ENFL) Division
2019 R&D 100 Award for "High-energy density and safe battery system for powering electric vehicles"
2018 Rising Star Award for Argonne Commercialization Excellence, Argonne National Laboratory

2016 The BASF and Volkswagen international "Science Award Electrochemistry 2016"
2020 Materials Today Rising Star Award
2020 ChemSocRev Pioneering Investigator Lectureship Award
2020 IBA Early Career Award
2019 Emerging Researcher Award, American Chemical Society (ACS) Division of Energy & Fuels (ENFL)
2016 International Automotive Lithium Battery (IALB) Young Investigator Award
2016 The International Academy of Electrochemical Energy Science (IAOEES) Award for Research Excellence in Electrochemistry Energy
2011-2013 EERE Postdoctoral Research Award, Vehicles Technology Program of the Department of Energy (DOE) Office of Energy Efficiency & Renewable Energy (EERE)
2008 Garr Cutler Energy Prize, University of Utah
2008 Material Research Society (MRS) Graduate Student Award
2008 University of Utah Graduate Travel Award
2006 The Excellent Chinese Graduate Student Studying Aboard Award from the Scholarship Council of the Ministry of Education of China
2000 Award of Outstanding Graduate Student from University of Science & Technology of China (USTC)

Editorial Board

- *Battery Energy* (Editor)
- *ACS Applied Materials and Interfaces* (Associated Editor, 2016-2025)
- *Research*, a Science partner Journal (Associated Editor, 2020-)
- *ACS Energy Letters* (Editorial Board)
- *Communications Chemistry* (Editorial Board)
- *Electrochemical Energy Reviews* (Editorial Board)
- *Carbon Energy* (Editorial Board)
- *Cell Reports Physics Science* (Editorial Board)
- *eScience* (Editorial Board)
- *ACS Applied Materials & Interfaces* (Guest Editor, Forum on "New Materials and Approaches for Beyond Li-ion Batteries", 2017)
- *Small* (Guest Editor, themed issue on "Flexible Energy-Storage Systems", 2018)
- *Small Methods* (Guest Editor, special issue on "Characterization Techniques for Li-ion Batteries and Beyond", 2018)

Entrepreneurship

- Quzhou Institute of Power Battery and Grid Energy Storage, President, 2023
- Zhejiang Longli New Energy Technology Inc., Founder, 2023
- Hangzhou Apex New Energy Technology Inc., Founder, 2023
- Quzhou Sodiya New Energy Technology Inc., Founder, 2024
- Quzhou Megrez Hydrogen Source Inc., Founder, 2024
- Quzhou Aojiu Energy Technology Inc., Founder, 2024
- Quzhou Power Battery and Grid Energy Storage Technology Inc., Founder, 2024
- Quzhou Zhongchi New Energy Technology Inc., Founder, 2024

Other Board Positions

- ACS Energy and Fuel (ENFL) Division, Chair-elected, 2022
- ACS Energy and Fuel (ENFL) Division, Program Chair, 2021
- Associate President and Board Committee Member, The International Academy of Electrochemical Energy Science (IAOEES), (2016-)
- General Secretary, International Automotive Lithium Battery (IALB) Association, (2015-)

- Member-at-large of Electrochemical Society (ECS) Battery Division, (2018-)

Professional Membership

- Solid State Ion Branch, Chinese Silicate Society
- Sol-gel Branch, Chinese Silicate Society
- Technical Advisory Committee, Hangzhou Service Station, China Chemical Society
- American Chemical Society
- Materials Research Society
- Electrochemical Society
- Golden Key International Honor Society

Other Professional Service

- Chief scientist, Changxing Taihu Electric Technology Inc.
- Chief advisor, Chuzhou Haina New Material Inc.
- Chair of International Conference on Electrochemical Energy Science and Technology (EEST2018), 2018, Niagara Fall, Canada
- Co-Chair of 2018 International Symposium on Functional Materials for Energy Storage-Carbon Energy Summit I, Wenzhou, China, 2018
- Symposium organizer of Lithium Ion Batteries (A02), 2021 ECS Spring Meeting (239th ECS Meeting), 2021, Chicago, IL
- Symposium organizer of Beyond Lithium Ion Batteries (A05), 2019 ECS Spring Meeting (236th ECS Meeting), 2019, Atlanta, GA
- Symposium organizer of Battery Characterization (A05), 2019 ECS Spring Meeting (235th ECS Meeting), 2019, Dallas, TX
- Symposium organizer of Materials for Chalcogen Electrochemistry in Energy Conversion and Storage (ET09), 2018 MRS Fall Meeting Symposia, 2018, Boston, MA.
- Organizer and General Secretary of the 11th International Conference on Advanced Lithium Batteries for Automotive Application (ABAA11), 2018, Huzhou, China.
- Organizer of Nature Conference, Materials Electrochemistry: Fundamentals and Applications, 2018, Shenzhen, China.
- Co-chair of International Conference on Electrochemical Energy Science and Technology (EEST2016), 2016, Kunming, China
- Organizer and General Secretary of the 9th International Conference on Advanced Lithium Batteries for Automotive Application (ABAA9), 2016, Huzhou, China.
- Symposium organizer of Beyond Lithium Ion Symposium for PRIME 2016 ECS fall meeting, Honolulu, HI.
- Symposium organizer of Innovative Electrochemical Energy Storage & Conversion, 250th ACS National Meeting & Exposition, 2015, Boston, MA
- Organizer of the 6th International Conference on Advanced Lithium Batteries for Automotive Application (ABAA), 2013, Argonne National Laboratory.

Representative Publication List

1. Haijin Ji, Jingwei Xiang, Yong Li, Mengting Zheng, Lixia Yuan*, Yaqi Liao, Lin Du, Zezhuo Li, Zhangyating Xie, Kai Huang, Xing Lin, Zhengkun Xie, Yue Shen, Ming Chen, Tongjiang Li, Guang Feng, Yongming Sun, Long Qie, Hui Li, Fangshu Zhang, Rui Guo, Xuning Feng, Weihua Chen, Xinping Ai, ***Jun Lu****, Yunhui Huang*. Liquid–liquid interfacial tension stabilized Li-metal batteries; **Nature**, 643,

(2025),1225-1262

2. Yuanjian Li, Sonal Kumar, Gaoliang Yang, ***Jun Lu**,*** Yan Yao*, Kisuk Kang*, Zhi Wei She*; The contrast between monovalent and multivalent metal battery anodes. **Science** (389)6766, **(2025),** eadl5482.

3. Lei Ye, Meng Liao, Kun Zhang, Mengting Zheng, Yi Jiang, Xiangran Cheng, Chuang Wang, Qiuchen Xu, Chengqiang Tang, Pengzhou Li, Yunzhou Wen, Yifei Xu, Xuemei Sun, Peining Chen, Hao Sun, Yue Gao, Ye Zhang, Bingjie Wang*, ***Jun Lu****, Haoshen Zhou*, Yonggang Wang*, Yongyao Xia, Xin Xu & Huisheng Peng* "A Rechargeable Calcium-Oxygen Battery that Operates at Room Temperature" ***Nature*****,** 626, 313–318 (**2024**)

4. Liguang Wang, Tongchao Liu, Tianpin Wu*, ***Jun Lu****, "Strain-retardant coherent perovskite phase stabilized Ni-rich cathode", ***Nature***, *611(7934)* **(2022)**, 61-67.

5. Tongchao Liu, Jiajie Liu, Luxi Li, Lei Yu, Jiecheng Diao, Tao Zhou, Shunning Li, Alvin Dai, Wenguang Zhao, Shenyang Xu, Yang Ren, Liguang Wang, Tianpin Wu, Rui Qi, Yinguo Xiao, Jiaxin Zheng, Wonsuk Cha, Ross Harder, Ian Robinson, Jianguo Wen, ***Jun Lu****, Feng Pan*, Khalil Amine*, "Origin of structural degradation in Li-rich layered oxide cathode", ***Nature***, 606(7913) **(2022)**, 305-312.

6. Tongchao Liu, ***Jun Lu****, "Lattice strain blights lithium-ion batteries", ***Nature***, Published online 8 June **2022**.

7. ***Jun Lu***[#], Yun Jung Lee[#], Xiangyi Luo[#], Kah Chun Lau[#], Mohammad Asadi[#], Hsien-Hau Wang, Scott Brombosz, Jianguo Wen, Dengyun Zhai, Zonghai Chen, Dean J. Miller, Yo Sub Jeong, Jin-Bum Park, Zhigang Zak Fang, Bijandra Kumar, Amin Salehi-Khojin, Yang-Kook Sun*, Larry A. Curtiss*, Khalil Amine*, "A lithium–oxygen battery based on lithium superoxide", ***Nature***, *529(7586)* **(2016)**, 377-382.

8. Matthew Li, ***Jun Lu****, "Cobalt in lithium-ion batteries", ***Science***, *367(6491)* **(2020)**, 979-980.

9. Haodong Liu, Zhuoying Zhu, Qizhang Yan, Sicen Yu, Xin He, Yan Chen, Rui Zhang, Lu Ma, Tongchao Liu, Matthew Li, Ruoqian Lin, Yiming Chen, Yejing Li, Xing Xing, Yoonjung Choi, Lucy Gao, Helen Sung-yun Cho, Ke An, Jun Feng, Robert Kostecki, Khalil Amine, Tianpin Wu, ***Jun Lu****, Huolin L. Xin*, Shyue Ping

Ong*, Ping Liu*, "A disordered rock salt anode for fast-charging lithium-ion batteries", ***Nature***, *585(7823)* **(2020)**, 63-67.

10. Jun Li, Yifei Yuan, Huile Jin, Huihang Lu, Aili Liu, Dewu Yin, Jichang Wang*, ***Jun Lu****, Shun Wang*, "One-step nonlinear electrochemical synthesis of TexSy@PANI nanorod materials for Li-TexSy battery", ***Energy Storage Materials***, 16, (**2019**), 31-36.
11. Meiling Wang, Ying Yao*, Xuanxuan Bi, Tuo Zhao, Guanzhong Zhang, Feng Wu, Khalil Amine, ***Jun Lu****, "Optimization of oxygen electrode combined with soluble catalyst to enhance the performance of lithium–oxygen battery", ***Energy Storage Materials***, 28, (**2020**), 73-81.
12. Yin Huang, Liang Xue*, Jiangfeng Huang, He Zhu, Hongfei Zheng, Lei Yu, Chao Wang, Pan Xiong, Jingwen Sun, Yongsheng Fu, ***Jun Lu***, Junwu Zhu*, "Clarifying the microscopic origin of Mn3+ ion instability in cathode oxides", ***Energy Storage Materials***, 82, (**2025**), 104624.
13. Jiewen Tan, Xin Ao, Alvin Dai, Yifei Yuan, Hao Zhuo, Hao Lu, Libin Zhuang, Yuxuan Ke, Chenliang Su, Xinwen Peng*, Bingbing Tian*, ***Jun Lu****, "Polycation ionic liquid tailored PEO-based solid polymer electrolytes for high temperature lithium metal batteries", ***Energy Storage Materials***, 33, (**2020**), 173-180.
14. Qidong Li, Qiulong Wei, Qinyou An, Lei Huang, Wen Luo, Xiaoji Ren, Kwadwo Asare Owusu, Feng Dong, Li Li, Peng Zhou, Liqiang Mai*, Qingjie Zhang, Khalil Amine, ***Jun Lu****, "Uncovering the Cu-driven electrochemical mechanism of transition metal chalcogenides based electrodes", ***Energy Storage Materials***, 16, (**2019**), 625-631.
15. Chao Yang, Wenxi Hu, Mengting Zheng, Xing Zhou, Xiaowei Liu, Jingting Yang, Dawei Xu, Meilong Wang, Youcai Zhang, Wen Chen, ***Jun Lu**** Ya You* Ultrafast thermo-responsive electrolyte for enhanced safety in lithium metal batteries,***Nature Energy*** 10, **(2025)**1493-1502
16. Qimeng Zhang, Jing Wang, Youqi Chu, Weiyuan Huang, Xiaojing Huang, Xianghui Xiao, Lu Ma, Tongchao Liu*, Khalil Amine*, ***Jun Lu****, Chenghao Yang* ; Intralattice-bonded phase-engineered ultrahigh-Ni single-crystalline cathodes

suppress strain evolution. ***Nature Energy,*** 10, (**2025**),1001-1012

17. Mengting Zheng, Xinxin Zhu, Hongfei Zheng, Zheng Bo*, ***Jun Lu****; Deployment strategies for Li-rich cathode materials in batteries. ***Nature Energy***, 10, **(2025)**,789-792

18. Jing Wang, Xuning Feng, Yongzheng Yu, Hai Huang, Mengting Zheng, Yunkai Xu, Junxiu Wu, Ying Yang*, ***Jun Lu****, Rapid temperature-responsive thermal regulator for safety management of battery modules, ***Nature Energy***,*9* **(2024)**, 993-946.

19. Tongchao Liu, Lei Yu, Jiajie Liu, ***Jun Lu****, Xuanxuan Bi, Alvin Dai, Matthew Li, Maofan Li, Zongxiang Hu, Lu Ma, Duan Luo, Jiaxin Zheng, Tianpin Wu, Yang Ren, Jianguo Wen, Feng Pan*, Khalil Amine*, "Understanding Co roles towards developing Co-free Ni-rich cathodes for rechargeable batteries," ***Nature Energy***, *6(3)* **(2021)**, 277-286.

20. Chengbin Jin, Tiefeng Liu, Ouwei Sheng, Matthew Li, Tongchao Liu, Yifei Yuan, Jianwei Nai, Zhijin Ju, Wenkui Zhang, Yujing Liu, Yao Wang, Zhan Lin, ***Jun Lu****, Xinyong Tao*, "Rejuvenating dead lithium supply in lithium metal anodes by iodine redox", ***Nature Energy***, *6(4)* **(2021)**, 378-387.

21. Gao-Feng Chen, Yifei Yuan, Haifeng Jiang, Shi-Yu Ren, Liang-Xin Ding, Lu Ma, Tianpin Wu, ***Jun Lu****, Haihui Wang*, "Electrochemical reduction of nitrate to ammonia via direct eight-electron transfer using a copper-molecular solid catalyst", ***Nature Energy***, *5(8)* **(2020)**, 605-613.

22. Xianyong Wu, Jessica J. Hong, Woochul Shin, Lu Ma, Tongchao Liu, Xuanxuan Bi, Yifei Yuan, Yitong Qi, T. Wesley Surta, Wenxi Huang, Joerg Neuefeind, Tianpin Wu, P. Alex Greaney*, ***Jun Lu****, Xiulei Ji*, "Diffusion-free Grotthuss topochemistry for high-rate and long-life proton batteries", ***Nature Energy***, *4(2)* **(2019)**, 123-130.

23. Enyuan Hu, Xiqian Yu*, Ruoqian Lin, Xuanxuan Bi, ***Jun Lu****, Seongmin Bak, Kyung-Wan Nam, Huolin L. Xin*, Cherno Jaye, Daniel A Fischer, Kahlil Amine, Xiao-Qing Yang, "Evolution of redox couples in Li- and Mn-rich cathode materials and mitigation of voltage fade by reducing oxygen release", ***Nature Energy***, *3(8)* **(2018)**, 690-698.

24. Guoqiang Tan, Rui Xu, Zhenyu Xing, Yifei Yuan, ***Jun Lu****, Jianguo Wen, Cong Liu, Lu Ma, Chun Zhan, Qi Liu, Tianpin Wu, Zelang Jian, Reza Shahbazian-Yassar, Yang Ren, Dean J. Miller, Larry A. Curtiss, Xiulei Ji*, Khalil Amine*, "Burning lithium in CS_2 for high-performing compact Li_2S-graphene nanocapsules for Li-S batteries", ***Nature Energy***, *2(7)* **(2017)**, 17090.

25. Chun Zhan, Zhenpeng Yao, ***Jun Lu****, Lu Ma, Victor A. Maroni, Liang Li, Eungje Lee, Esen E. Alp, Tianpin Wu, Jianguo Wen, Yang Ren, Christopher Johnson, Michael M. Thackeray, Maria K. Y. Chan, Chris Wolverton*, Khalil Amine*, "Enabling the high capacity of lithium-rich anti-fluorite lithium iron oxide by simultaneous anionic and cationic redox", ***Nature Energy***, *2(12)* **(2017)**, 963-971.

26. ***Jun Lu****, Tianpin Wu, Khalil Amine*, "State-of-the-art characterization techniques for advanced lithium-ion batteries ", ***Nature Energy***, *2(3)* **(2017)**, 17011.

27. Zhi Zhu, Akihiro Kushima, Zongyou Yin, Lu Qi*, Khalil Amine, ***Jun Lu****, Ju Li*, "Anion-redox nanolithia cathodes for Li-ion batteries", ***Nature Energy***, *1(8)* **(2016)**, 16111.

28. Zhimeng Liu, Yuqiang Zeng, Junyang Tan, Hailong Wang, Yudong Zhu, Xin Geng, Peter Guttmann, Xu Hou, Yang Yang, Yunkai Xu, Peter Cloetens, Dong Zhou, Yinping Wei, **Jun Lu***, Jie Li*, Bilu Liu, Martin Winter, Robert Kostecki, Yuanjing Lin*, Xin He*; Revealing the degradation pathways of layered Li-rich oxide cathodes, ***Nature Nanotechnology*** 19, 1821–1830 **(2024)**

29. Yuliang Cao, Matthew Li, ***Jun Lu****, Khalil Amine*, "Bridging the academic and industrial metrics for next-generation practical batteries", ***Nature Nanotechnology***, *14(3)* **(2019)**, 200-207.

30. Tongchao Liu, Lingpiao Lin, Xuanxuan Bi, Leilei Tian, Kai Yang, Jiajie Liu, Maofan Li, Zonghai Chen, ***Jun Lu****, Khalil Amine*, Kang Xu*, Feng Pan*, "In situ quantification of interphasial chemistry in Li-ion battery", ***Nature Nanotechnology***, *14(1)* **(2019)**, 50-56.

31. Qidi Wang#, Dong Zhou#, Chenglong Zhao#*, Jianlin Wang#, Hao Guo, Liguang Wang, Zhenpeng Yao, Deniz Wong, Götz Schuck, Xuedong Bai, ***Jun Lu****, Marnix Wagemaker*. "Fast-charge high-voltage layered cathodes for sodium-ion batteries",

Nature Sustainability **(2024).**

32. Yifei Yuan, Ryan Sharpe, Kun He*, Chenghang Li, Mahmoud Tamadoni Saray, Tongchao Liu, Wentao Yao, Meng Cheng, Huile Jin, Shun Wang, Khalil Amine, Reza Shahbazian-Yassar*, M. Saiful Islam*, ***Jun Lu****, "Understanding intercalation chemistry for sustainable aqueous zinc–manganese dioxide batteries", ***Nature Sustainability,*** *5(10)* **(2022)**, 890-898.
33. Matthew Li, ***Jun Lu****, "Ferric sauce for potassium-ion battery", ***Nature Sustainability***, *5(3)* **(2022)**, 183-184.
34. Zihan Shen, Xin Jin, Jiaming Tian, Matthew Li, Yifei Yuan, Shuo Zhang, Susu Fang, Xing Fan, Weigao Xu, Hong Lu, ***Jun Lu****, Huigang Zhang*, "Cation-doped ZnS catalysts for polysulfide conversion in lithium-sulfur batteries", ***Nature Catalysis***, *5(6)* **(2022)**, 555-563.
35. Yuhang Dai, Ruihu Lu, Chengyi Zhang, Jiantao Li, Yifei Yuan, Yu Mao, Chumei Ye, Zhijun Cai, Jiexin Zhu, Jinghao Li, Ruohan Yu, Lianmeng Cui, Siyu Zhao, Qinyou An, Guanjie He, Geoffrey IN Waterhouse, Paul R Shearing, Yang Ren, ***Jun Lu****, Khalil Amine*, Ziyun Wang*, Liqiang Mai*, Zn^{2+}-mediated catalysis for fast-charging aqueous Zn-ion batteries, ***Nature Catalysis***, *7* **(2024)**, 776-784.
36. Mengting Zheng, Ya You*, ***Jun Lu****; Understanding materials failure mechanisms for the optimization of lithium-ion battery recycling, ***Nature Reviews Materials***, 10, **(2025)**, 355-368
37. Matthew Li, ***Jun Lu****, Xiulei Ji, Yanguang Li, Yuyan Shao, Zhongwei Chen, Cheng Zhong*, Khalil Amine*, "Design strategies for nonaqueous multivalent-ion and monovalent-ion battery anodes", ***Nature Reviews Materials***, *5(4)* **(2020)**, 276-294.
38. Xing Zhou, Chao Yang, Xiaowei Liu, Xin Peng, Yongyuan Zhou, Liguang Wang, Tongchao Liu, Ya You*, ***Jun Lu****； Inhibiting inter-layer gliding in transition metal layered oxides through interphase engineering for sodium-ion batteries.***Nature Communications***, 16, (**2025**),6691
39. Haolin Luo, Zhixi Liu, Haifeng Lv, Junie Jhon M. Vequizo, Mengting Zheng, Feng Han, Zhen Ye, Akira Yamakata, Wenfeng Shangguan, Adam F. Lee, Xiaojun Wu, Domen Kazunari, ***Jun Lu****, Zhi Jiang*； Efficient and stable n-type sulfide overall

water splitting with separated hydrogen production. ***Nature Communications***, 16, (**2025)**,8786

40. Qi Hao, Qi Tang, Lirong Zheng, Kai Liu*, Junxiu Wu*, ***Jun Lu**** ; Specific construction of asymmetric carbon-nickel-chlorine single-atom sites via carbon vacancy engineering for efficient CO2 electroreduction. ***Nature Communications,*** 16, (**2025)**,8365

41. Jimin Tang, Zhixuan Wei, Junxiu Wu, Zhuangzhuang Cui, Ruiyuan Tian, Heng Jiang, Fei Du*, ***Jun Lu**** ; Neighboring alkenyl group participated ether-based electrolyte for wide-temperature lithium metal batteries. ***Nature Communications***, 16, (**2025)**,7917

42. Jun Huang, Qirui Yang, Anyi Hu, Zhu Liao, Zhengxi Zhang, Qinfeng Zheng, Zhouhong Ren, Shun Zheng, Yixiao Zhang, Xiaolong Yang, Zhenming Xu, Le Zhang, Daming Zhu, Wen Wen, Xi Liu, Akihiro Orita, Nagahiro Saito, Liguang Wang, Yongyao Xia, Liwei Chen, ***Jun Lu****, Li Yang*; Enhanced specific energy in fast-charging lithium-ion batteries negative electrodes via Ti-O covalency-mediated low potential. ***Nature Communications***, 16, (**2025)**,6243

43. Chunlei Song, Lyuming Pan, Junxiu Wu, Lu Chen, He Zhao, Hongji Pan, Shumin Wu, Liu Yang, Yanxin Jiang, Yiju Li*, Tianshou Zhao* , ***Jun Lu**** ; Bioinspired interfacial nanofluidic layer enabling high-rate and dendrite-free lithium metal negative electrodes. ***Nature Communications,*** 16, (**2025)**,8056

44. Huasen Shen, Zhaohuai Li, Jiantao Li, Qiu He, Mengjun Li, Yunan Tian, Guoning Wu, Yan Zhao, Xuanxuan Zhang, Jingjing Xiao, Khalil Amine, Yuyu Li*, Ming Xie*, ***Jun Lu****; Industrializable interlayer with catalytic conversion of dead lithium for Ah‐level Nickel‐rich lithium metal batteries. ***Nature Communications***, 16, (**2025)**,5462

45. Haolin Zhu, Linfeng Peng*, Junxiu Wu, Siwu Li, Qiang Wu, Shijie Cheng, Jia Xie*, ***Jun Lu****; Fluorine-doped micropore-covered mesoporous carbon nanofibers for long-lasting anode-free sodium metal batteries. ***Nature Communications***, 16, (**2025)**,5494

46. Zhixiao Xu, Yunkai Xu, Yunkun Qiu, Yan Cao, Sergey Gasilov, Ge Li, ***Jun Lu****, Xiaolei Wang*; Pressurized organic electrodes enable practical and extreme batteries. ***Nature Communications****,* 16, (**2025)**,4561

47. Meilong Wang, Luming Yin, Mengting Zheng, Xiaowei Liu, Chao Yang, Wenxi Hu, Jingjing Xie, Ruitao Sun, Jin Han, Ya You*, ***Jun Lu****, "Temperature-responsive solvation enabled by dipole-dipole interactions towards wide-temperature sodium-ion batteries", ***Nature Communications***,15, **(2024)**, 8866 .

48. Yufeng Chen, Zhongling Lang, Kun Feng, Kang Wang, Yangguang Li, Zhenhui Kang, Lin Guo*, Jun Zhong*, ***Jun Lu****, "Practical H2 supply from ammonia borane enabled by amorphous iron domain", ***Nature Communications***,15, **(2024)**, 9113 .

49. Yuanjian Li, Xiang Feng, Gaoliang Yang, Wei Ying Lieu, Lin Fu, Chang Zhang, Zhenxiang Xing, Man-Fai Ng, Qianfan Zhang, Wei Liu*, ***Jun Lu****, Zhi Wei Seh*, "Toward waterproof magnesium metal anodes by uncovering water-induced passivation and drawing water-tolerant interphases", ***Nature Communications***, 15, **(2024),** 9364.

50. Hailong Wang, Xin Geng, Linyu Hu, Jun Wang, Yunkai Xu, Yudong Zhu, Zhimeng Liu, ***Jun Lu****, Yuanjing Lin*, Xin He*. "Efficient direct repairing of lithium-and manganese-rich cathodes by concentrated solar radiation", ***Nature Communications***,15 **(2024)**, 1634.

51. Jie Xu#, Xiong-Xiong Xue#, Gonglei Shao*, Changfei Jing, Sheng Dai, Kun He, Peipei Jia, Shun Wang, Yifei Yuan*, Jun Luo*, ***Jun Lu****. "Atomic-level polarization in electric fields of defects for electrocatalysis", ***Nature Communications***, 14 **(2023)**, 7849.

52. Shuo Zhang, Jianghua Wu, Mengting Zheng, Xin Jin, Zihan Shen, Zhonghua Li, Yanjun Wang, Quan Wang, Xuebin Wang, Hui Wei, Jiangwei Zhang, Peng Wang, Shanqing Zhang, Liyan Yu, Lifeng Dong, Qingshan Zhu*, Huigang Zhang*, ***Jun Lu****. "Fe/Cu diatomic catalysts for electrochemical nitrate reduction to ammonia", ***Nature Communications*** 14 **(2023)**, 3634.

53. Guangzhao Zhang#, Jian Chang#, Liguang Wang, Jiawei Li, Chaoyang Wang, Ruo

Wang, Guoli Shi, Kai Yu, Wei Huang, Honghe Zheng, Tianpin Wu*, Yonghong Deng*, ***Jun Lu****. "A monofluoride ether-based electrolyte solution for fast-charging and low-temperature non-aqueous lithium metal batteries", ***Nature Communications*** 14 **(2023)**, 1081

54. Ge Li, Xiaolei Wang, Min Ho Seo, Matthew Li, Lu Ma, Yifei Yuan, Tianpin Wu, Aiping Yu, Shun Wang*, ***Jun Lu****, Zhongwei Chen*, "Chemisorption of polysulfides through redox reactions with organic molecules for lithium–sulfur batteries", ***Nature Communications***, *9(1)* **(2018)**, 705.
55. Shitong Wang, Wei Quan, Zhi Zhu, Yong Yang, Qi Liu, Yang Ren, Xiaoyi Zhang, Rui Xu, Ye Hong, Zhongtai Zhang, Khalil Amine, Zilong Tang*, ***Jun Lu****, Ju Li*, "Lithium titanate hydrates with superfast and stable cycling in lithium ion batteries", ***Nature Communications***, *8(1)* **(2017)**, 627.
56. Yifei Yuan, Khalil Amine, ***Jun Lu****, Reza Shahbazian-Yassar*, "Understanding materials challenges for rechargeable ion batteries with *in situ* transmission electron microscopy", ***Nature Communications***, *8(1)* **(2017)**, 15806.
57. Lele Peng, Pan Xiong, Lu Ma, Yifei Yuan, Yue Zhu, Dahong Chen, Xiangyi Luo, ***Jun Lu****, Khalil Amine, Guihua Yu*, "Holey two-dimensional transition metal oxide nanosheets for efficient energy storage", ***Nature Communications***, *8(1)* **(2017)**, 15139.
58. Qiu Yang, Wenxian Liu, Bingqing Wang, Weina Zhang, Xiaoqiao Zeng, Cong Zhang, Yongji Qin, Xiaoming Sun, Tianpin Wu, Junfeng Liu*, Fengwei Huo*, ***Jun Lu****, "Regulating the spatial distribution of metal nanoparticles within metal-organic frameworks to enhance catalytic efficiency", ***Nature Communications***, *8(1)* **(2017)**, 14429.
59. Guoqiang Tan, Feng Wu*, Yifei Yuan, Renjie Chen*, Teng Zhao, Ying Yao, Ji Qian, Jianrui Liu, Yusheng Ye, Reza Shahbazian-Yassar, ***Jun Lu****, Khalil Amine, "Freestanding three-dimensional core–shell nanoarrays for lithium-ion battery anodes", ***Nature Communications***, *7(1)* **(2016)**, 11774.
60. Yifei Yuan, Chun Zhan, Kun He, Hungru Chen, Wentao Yao, Soroosh Sharifi-Asl, Boao Song, Zhenzhen Yang, Anmin Nie, Xiangyi Luo, Hao Wang, Stephen M.

Wood, Khalil Amine, M. Saiful Islam*, ***Jun Lu****, Reza Shahbazian-Yassar*, "The influence of large cations on the electrochemical properties of tunnel-structured metal oxides," ***Nature Communications***, *7(1)* **(2016)**, 13374.

61. ***Jun Lu#****, Chun Zhan#, Tianpin Wu, Jianguo Wen, Yu Lei, A. Jeremy Kropf, Huiming Wu, Dean J. Miller, Jeffrey W. Elam, Yang-Kook Sun, Xinping Qiu*, Khalil Amine*, "Effectively suppressing dissolution of manganese from spinel lithium manganate via a nanoscale surface-doping approach", ***Nature Communications***, *5(1)* **(2014)**, 5693.
62. Alex Yong Sheng Eng, Chhail Bihari Soni, Yanwei Lum, Edwin Khoo, Zhenpeng Yao, S. K. Vineeth, Vipin Kumar, ***Jun Lu****, Christopher S. Johnson*, Christopher Wolverton*, Zhi Wei Seh*, "Theory-guided experimental design in battery materials research", ***Science Advances***, *8(19)* (**2022**), eabm2422.
63. Jinqiang Zhang, Yufei Zhao, Bing Sun*, Yuan Xie, Anastasia Tkacheva, Feilong Qiu, Ping He, Haoshen Zhou, Kang Yan, Xin Guo, Shijian Wang, Andrew M. McDonagh, Zhangquan Peng*, ***Jun Lu****, Guoxiu Wang*, "A long-life lithium-oxygen battery via a molecular quenching/mediating mechanism", ***Science Advances***, *8(3)* (**2022**), eabm1899.
64. Wei Huang, Yongpan Hu, Zhengyuan Qin, Yujin Ji, Xuan Zhao, Yunling Wu, Qing He, Youyong Li, Chunfeng Zhang, ***Jun Lu****, Yanguang Li*, "Highly crystalline and water-wettable benzobisthiazole-based covalent organic frameworks for enhanced photocatalytic hydrogen production", ***National Science Review***, *10(1)* (**2023**), nwac171.
65. Fanqi Chen, Junwei Han, Debin Kong, Yifei Yuan, Jing Xiao, Shichao Wu, Dai-Ming Tang*, Yaqian Deng, Wei Lv, ***Jun Lu****, Feiyu Kang, Quan-Hong Yang*, "1000 Wh L^{-1} lithium-ion batteries enabled by crosslink-shrunk tough carbon encapsulated silicon microparticle anodes", ***National Science Review***, *8(9)* **(2021)**, nwab012.
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Selected Patents

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2. "Catalytic cathode for a lithium-oxygen battery", X。 Zeng, K. Amine, ***J. Lu****, Y. Guo, US Patent No.11,545,675.
3. "Anionic redox active lithium iron oxide based cathode materials for rechargeable lithium ion batteries", C. M. Wolverton, Z. Yao, Chun Zhan, ***J. Lu****, K. Amine, US Patent No.11,664,526.
4. "Rechargeable lithium-hydroxide based non-aqueous lithium oxygen batteries", Xuanxuan Bi, ***J. Lu****, K. Amine, US Patent No.11,264,659.
5. "Rechargeable non-aqueous sodium-air batteries", X. Bi, ***J. Lu****, K. Amine, US Patent No.11,387,492.
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7. "High capacity lithium ion batteries having oxides, peroxides, or superoxides as cathode active materials", ***J. Lu****, R. Xu, X. Luo, K. Amine, US Patent No.10,193,144.
8. "Li_2S batteries having high capacity, high loading, and high coulombic efficiency", ***J. Lu****, R. Xu, K. Amine, X. Ji, US Patent No.10,170,756.
9. "Bi-metallic nanoparticles as cathode electrocatalysts", ***J. Lu****, K. Amine, X. Wang, X. Luo, D. J. Myers, US Patent No.9,929,453.
10. "Porous graphene nanocages for battery applications", K. Amine, ***J. Lu****, P. Du, J. Wen, L. A. Curtiss, US Patent No.9,590,248.
11. "Lithium-oxygen batteries incorporating lithium superoxide", ***J. Lu****, K. Amine, L. Curtiss, K. C. Lau, Y. Sun, Y. Lee, X. Luo, US Patent No.9,553,316.
12. "Systems and methods for hydrogen storage and generation from water using lithium based materials", ***J. Lu****, Z. Zak Fang, H. Y. Sohn, World Intellectual Property Patent WO2007102994.

13. "Lithium-air batteries, method for making lithium-air batteries", Stefan Vajda, Larry A. Curtiss, ***J. Lu****, K. Amine, E. C. Tyo, US Patent No.9,496,590 B2.
14. "Lithium air batteries having ether-based electrolytes", K. Amine, L. Curtiss, ***J. Lu****, K. C. Lau, Z. Zhang, Y. Sun, US Patent No.9,478,837
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17. "Hydrogen storage in a combined $M_xAlH_6/M'_y(NH_2)_z$ System and Methods of Making and Using the Same", ***J. Lu****, Z. Z. Fang, and H. Y. Sohn, US Patent No.8,147,796.
18. "Light Metal Based Material System for Hydrogen Storage", ***J. Lu****, H. Y. Sohn, Z. Z. Fang, World Intellectual Property Patent WO2008057340.
19. "Synthesis of Nanometer Phosphide Semiconductor Materials via Hydrothermal Method", Y. Xie, S. Gao, ***J. Lu****, China Patent No.CN02138423.1.
20. "A Novel Synthesis Method for 6-phenylfulvene", Y. Xie, S. Gao, ***J. Lu****, China Patent No.CN02138424.X.
21. "Solvothermal Synthesis of Metastable Zinc Blende GaN", Y. Xie, F. Xu, ***J. Lu****, China Patent No.CN02138461.4.
22. "A Red Phosphorus Anode, Preparation Method and Application in Li-ion Batteries", ***J. Lu****, J. Liu, China Patent No.CN202311543192.6
23. "Preparation and Application of Si/C Thick Electrode for Li-ion Batteries", ***J. Lu****, J. Liu, China Patent No.CN202311631598.X
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25. "Preparation and Application of Si/C anode material for Li-ion Batteries", ***J. Lu****, J. Liu, China Patent No. CN202311543193.0

Presentations

1. (Keynote) "Application of Advanced Characterization Techniques in Studying the Energy Storage Mechanism of High-Energy-Density Layered Oxide Cathode Materials" The 22nd National Electrochemical Conference, Haikou, China, Nov. 6, 2024.
2. (Keynote) "Development of Long-Cycle-Life Aqueous Batteries" 2024 International Symposium on New Energy Chemistry and Materials, Tianjin, China, Aug. 17, 2024.
3. (Keynote) "Design of Sulfur Cathodes for High-Energy-Density Lithium-Sulfur Batteries" The 34th Academic Annual Meeting of the Chinese Chemical Society, Zhengzhou, China, Jun. 17, 2024.
4. (Keynote) "Development of Lithium-Sulfur Batteries from Liquid-State to Solid-State" The 4th National Conference on Energy and Environmental Materials, nanchang, China, Apr. 13, 2024.
5. (Keynote) "Research Progress on Lithium-Air Batteries" 2024 Guangzhou Frontier Interdisciplinary Forum on Molecular Engineering+, Guangzhou, China, Nov. 9, 2024.
6. (Keynote) "Li-oxygen Battery: From Open System to Close System", 2023' Sol-Gel Symposium of China & International Forum, Jinan, China, October 20-23, 2023
7. (Keynote) "Opportunities and challenges in high energy density cathode materials", 2022&2023 The International Summit on Composites Science and Technology, July 01-03, 2023, Dongguan, China
8. (Keynote) "The challenges and opportunities facing high energy density cathode materials", The 21st National Conference on Solid State Ionics, March 31-April 3, 2023, Nanjing, China (Keynote)
9. Jun Lu, "Layered Oxides For Lithium-Ion Batteries", The 7th International Forum On Cathode & Anode Materials for Advanced Batteries And The 1st Independent Sodium

Battery Technology and Market Development Forum, April 10-12, 2023, Suzhou, China (Keynote)

10. (Keynote) "High-Energy-Density Cathode Materials for Sodium-Ion Batteries", China International Sodium-ion Battery Frontier Technology and Industry Development Forum, March 10-12, 2023, Wenzhou, China
11. (Keynote) "Encapsulating Various Sulfur Allotropes within Graphene Nanocages for Long-Lasting Lithium Storage", 2019 Spring Meeting, April 22-26, 2019, Phoenix, Arizona .
12. (Keynote) "Enabling the high capacity of lithium-rich anti-fluorite lithium-iron oxide by simultaneous anionic and cationic redox", 257th Spring 2019 ACS National Meeting, March 31-April 4, 2019, Orlando, FL.
13. (Keynote) "Enabling the High Capacity of Lithium-Rich Anti-Fluorite Lithium-Iron Oxide by Simultaneous Anionic and Cationic Redox", 2018 MRS Fall Meeting November 25-November 30, 2018, Boston, MA.
14. (Keynote) "Amorphous MoS_3 as the sulfur-equivalent cathode material for room-temperature Li-S and Na-S batteries", 256th ACS National Meeting, August 19-23, 2018 Fall Meeting, Boston, MA.
15. (Keynote) "Chemical immobilization and conversion of active polysulfides directly by copper current collector: A new approach to enabling stable room-temperature Li-S and Na-S batteries". 256th ACS National Meeting, August 19-23, 2018 Fall Meeting, Boston, MA.
16. (Keynote) "Exploring the Combined Anionic and Cationic Redox Reactivity in the Super Li-Rich Li_5FeO_4 Based High-Energy-Density Cathode Materials", 2018 MRS Spring Meeting April 2-6, 2018, Phoenix, Arizona.
17. (Keynote) "Burning" lithium in CS_2: Compact Li_2S@graphene nanocapsules for Li-S batteries", 255th ACS National Meeting, Mar 18-22, 2018, New Orleans, LA.
18. (Keynote) "Lithium-oxygen battery based on lithium superoxide", 254th ACS National Meeting August 20-24, 2017, Washington, DC.
19. (Keynote) "Innovative Sn/3D-carbon composite anodes for long cycle lithium-ion battery", 254th ACS National Meeting, August 20-24, 2017, Washington, DC.
20. (Keynote) "Stable CuO@CNx core-shell nanoarrays for Li-ion battery anodes", 254th ACS National Meeting, August 20-24, 2017, Washington, DC.
21. (Invited Talk) "Anion-Redox Solid Nanolithia Cathode for Li-ion Battery", 4th Euro-Mediterranean Conference on Materials and Renewable Energies, May 8-11, 2017, Marrakech, Morocco.
22. (Invited Talk) "A Lithium-Oxygen Battery Based on Lithium Superoxide", The 2017 MRS Spring Meeting, April 17-21, 2017, Phoenix, Arizona.
23. (Invited Talk) "High Energy Electrodes for Automotive Battery Applications", The 3rd International Forum on Cathode & Anode Materials for Advanced Batteries, April 13-14, 2017, Ningbo, China.
24. (Invited Talk) "Lithium air batteries based on lithium Superoxide", The 12th U.S.-China Electric Vehicle and Battery Technology Information Exchange, April 16-18, 2017, Zhuhai, China.
25. (Invited Talk) "A Lithium-Oxygen Battery Based on Lithium Superoxide", HKUST - Argonne National Lab Workshop on Energy Storage Systems, Jan 4, 2017, Hongkong, China.
26. (Invited Talk) "A Lithium-Oxygen Battery Based on Lithium Superoxide", 2016 MRS Fall Meeting & Exhibit, November 27-December 2, 2016, Boston, MA.
27. (Invited Talk) "A Lithium-Oxygen Battery Based on Lithium Superoxide", 2016 (11th) International Forum on Li Battery Technology & Industrial Development, October 22-October 23, 2016, Hefei, China.
28. (Invited Talk) "A Lithium-Oxygen Battery Based on Lithium Superoxide", 11th U.S.-China Electric Vehicle and Battery Technology Workshops, August 25-26, 2016, Denver, CO.

29. (Keynote) "A Lithium-Oxygen Battery Based on Lithium Superoxide", International Conference on Electrochemical Energy Science and Technology (EEST2016), August 16-22, 2016, Kunming, China.
30. (Invited Talk)"Effectively Suppressing Dissolution of Manganese from LiMn2O4 Spinel via a Novel Nanoscale Surface-doping Approach", 251th ACS National Meeting, March 13-17, 2016, San Diego, CA.
31. (Invited Talk) Jun Lu, "Hydrogen Storage Properties of Nanosized MgH2-0.1TiH2 Prepared by Ultrahigh-Energy-High-Pressure Milling", The International Chemical Congress of Pacific Basin Societies (Pacific Chem 2015), December 15-20, 2015, Honolulu, Hawaii.
32. (Invited Talk) "A Nanostructured Cathode Architecture for Low Charge Overpotential in Lithium-Oxygen Batteries", 2015 (10th) International Forum on Li Battery Technology & Industrial Development, October 13-October 15, 2015, Beijing, China.
33. (Invited Talk) "Effect of the Size-selective Silver Clusters on Li_2O_2 Morphology in Lithium-Oxygen Batteries", 8th International Conference On Advanced Lithium Batteries For Automobile Applications (ABAA8), September30-October 2, 2015, Bilbao, Spain.
34. (Invited Talk) "Free-standing hierarchically sandwich-type tungsten disulfide nanotubes/graphene anode for lithium-ion batteries", 2015 MRS Spring Meeting & Exhibit, April 6-10, 2015, San Francisco, CA.
35. (Invited Talk) "In-situ Fabrication of Porous Carbon Supported α-MnO_2 Nanoparticles at Room Temperature: Application for Rechargeable Li-air Battery", 249th ACS National Meeting, March 22-26, 2015, Denver, CO.
36. (Invited Talk) "A Nanostructured Cathode Architecture for Low Charge Overpotential in Lithium-Oxygen Batteries", 2014 APS/CNM/EMC Users Meeting, May 12-15, 2014, Argonne National Laboratory, IL.
37. (Invited Talk) "A Nanostructured Cathode Architecture for Low Charge Overpotential in Lithium-Oxygen Batteries" BK21+ workshop on energy storagea, April 1-3, 2014, South Kore.
38. (Invited Talk) "Advanced high energy and high-power battery systems for automotive applications" SAE 2014 Hybrid and Electric Vehicle Technologies Symposium, Feb 11-13, 2014, La Jolla, California.
39. (Invited Talk) "In-Situ Fabrication of Porous-carbon-supported α-MnO2 Nanorods at Room Temperature: Application for Rechargeable Li-O_2 Battery", 2013 APS/CNM/EMC Users Meeting, May 6-9, 2013, Argonne National Laboratory, IL.
40. (Invited Talk) Jun Lu, "Metal Oxide Prepared by a Wet-Chemistry Approach: Application for Rechargeable Li-O_2 Battery", 7th U.S.-China Electric Vehicle and Battery Technology Workshop, Lawrence Berkeley National Laboratory, April 4-5, 2013, Berkeley, California.
41. (Invited Talk) "In-situ Fabrication of Porous Carbon Supported alpha-MnO_2 Nanoparticles at Room Temperature: Application for Rechargeable Li-air Battery" 36th International Conference and Exposition on Advanced Ceramics and Composites, January 22-27, 2012, Daytona Beach, Florida.
42. (Oral presentation) "In-situ Fabrication of Porous Carbon Supported alpha-MnO2 Nanoparticles at Room Temperature: Application for Rechargeable Li-air Battery", 221st ECS Meeting, May 6 - May 10, 2012, Seattle, Washington.
43. (Oral presentation) "Potential and Reaction Mechanism of Li-Al-Mg-N-H System for Reversible Hydrogen Storage", presented during 2008 MRS Spring Meeting, March 27, 2008, San Francisco, CA.
44. (Oral presentation) "The Potential of Binary Lithium Magnesium Nitride - LiMgN for Hydrogen Storage Application", Presented during 2007 MRS Fall meeting, Boston, MA, November 26-28, 2007. [Oral presentation]
45. (Oral presentation) "Effect of Mechanical Milling on Light Metal based hydrogen storage", Presented during 2007 TMS annual meeting, February 25-March 1, 2007, Orlando, FL.

46. (Oral presentation) "A New Li-Al-N-H System for Reversible Hydrogen Storage", presented during MRS Spring Meeting, San Francisco, CA, April 20, 2006. [Oral presentation]
47. (Oral presentation) "A Study of Nanosized WC-Co Powder During Heating Using Differential Scanning Calorimetry (DSC)", present during Powder Metallurgy meeting, June 21, 2006, San Diego, CA.
48. (Poster) "Hydrogen Storage Property of New Li-Al-N-H System", 2007 AIChE Annual Meeting Conference, paper 335 ak, November 4-9, 2007, Salt Lake City, Utah.
49. (Poster) "A New Li-Al-N-H System for Reversible Hydrogen Storage", October 26, 2006, San Babala, CA.
50. (Poster) "Enhanced Properties of High-Capacity Nanostructured Metal Hydrides", Sohn International Symposium, Advanced Processing of Metal and Materials, TMS. August 27-31, 2006, San Diego, CA.