

Dr. Leiting Zhang

Education

- 09/2014–12/2017 The Hong Kong University of Science and Technology (HKUST), China Collège de France (CdF), France (*co-supervision*)
- PhD in Chemical & Biological Engineering (*conferred on June 15, 2018*)
 - Dissertation: Understanding the *in situ* fluorination of high capacity cathode materials for rechargeable batteries
- 09/2011–08/2014 The Hong Kong University of Science and Technology, China
- MPhil in Chemical & Biomolecular Engineering
 - Thesis: Synthesis and characterization of LiFeSO₄F as cathode material for Li-ion batteries
- 01/2010–06/2010 The University of Minnesota, Twin Cities, USA
- Exchanged at the Department of Chemical Engineering and Material Science
- 09/2007–06/2011 The Hong Kong University of Science and Technology, China
- B.Eng. in Chemical Engineering (*honors*)
 - Final Year Project: Design of Li-ion batteries for electric vehicles

Employment

- 05/2021–08/2022 Postdoctoral Researcher (100% Research), Uppsala University (UU), Sweden
- Conducted autonomous electrolyte screening for aqueous Li-ion batteries
- 05/2018–04/2021 Postdoctoral Researcher, Paul Scherrer Institute (PSI), Switzerland
- Performed *operando* gas analysis of Li/Na-ion batteries 12/2017–
- 04/2018 Research Associate, Hong Kong Polytechnic University, China
- Investigated activation mechanism of composite electrodes for Li-ion batteries

Teaching Experience

- 08–09/2022 Lecture & seminar teacher (Dept. Chem. – Ångström, UU)
- 1KB744 *Introduction to Energy Storage*
 - 03–05/2022 Laboratory teacher (Dept. Chem. – Ångström, UU)
 - 1KB208 *Inorganic Chemistry*
 - 02/2022 Lecture teacher (Dept. Chem. – Ångström, UU)
 - 1KB276 *Batteries for Electromobility*
 - 06/2019 Teaching assistant (Dept. Chem. & Appl. Biosci., ETH Zürich)
 - 529-0507-00L *Hands-on Electrochemistry for Energy Storage and Conversion Applications*
 - 09/2011–01/2013 Teaching assistant (Dept. Chem. & Biomol. Eng., HKUST)
 - CENG1010 *Academic and Professional Development I*
 - CENG1980 *Chemical Process Simulation with ASPEN Plus*
 - CENG2220 *Process Fluid Mechanics*

Supervision Experience

- 08/2021–Present Co-supervisor of PhD student, UU
- 09/2019–12/2019 Co-supervisor of internship student, PSI
- 04/2019–10/2019 Main supervisor of master-degree student, PSI
- 06/2012–08/2012 Co-supervisor of bachelor-degree exchange student, HKUST
- 09/2011–06/2012 Co-supervisor of bachelor-degree final year project students, HKUST

Outreach Activities

- 06/2022 Helped organize the Young Scientist Event under Battery2030+ Initiative
- 05/2022 Give a 1-hour lecture on electrochemical methods to analyze Li-ion batteries to 15 master-degree students from the Royal Institute of Technology (KTH)
- 12/2017 Helped organize the Asian Pacific Confederation of Chemical Engineering (APCChE) and worked as conference photographer
- 10/2016 Performed interactive experiments to the public on energy storage systems in the Fête de la Science 2016, CdF
- 05/2012 Interviewed prospective local secondary-school graduates *via* the Joint University Programmes Admissions System, HKUST
- 2011–2014 Helped organize events and demonstrations to prospective students and parents during outreach days, HKUST
- 09/2011 Attended teaching assistant training (2 weeks), HKUST
- 06/2011–12/2011 Helped plan, organize, and coordinate the International Advanced Electrochemical Energy Symposium, HKUST
- 2008–2009 Mentored new undergraduate students from Mainland, Taiwan, and Macau, shared positive experiences and received feedback, HKUST

Awards

05/2022	Seal of Excellence Award, MSCA Postdoctoral Fellowships 2021, Horizon Europe Marie Skłodowska-Curie Actions, European Commission
09/2017	Chan Tak Kei & Wong Kwai Ying Best PG Award for Excellent Research, Department of Chemical and Biological Engineering, HKUST
04/2016	Overseas Research Awards, School of Engineering, HKUST
09/2014 2016	French Scholarship Program, Consulate General of France in Hong Kong 2011–Postgraduate Studentship, HKUST
03/2012	Sinopoly Battery Scholarship, Sinopoly Battery Research Center, Shanghai
05/2011	Gold Award, President's Cup, HKUST
04/2011	First Runner-up, Mr. Armin and Mrs. Lillian Kitchell Undergraduate Research Award, HKUST
01/2010	International Exchange Scholarship, University of Minnesota, Twin Cities

Grants, Funding & Beamtime

07/2017	Allocated 15 shifts of beamtime at the ROCK beamline of the SOLEIL synchrotron facility (France), Proposal number: 20170157
06/2017	Allocated 0.5 shifts of beamtime at the 11-ID-B beamline of the Advanced Photon Source (USA), Proposal number: RA-GUP-54483
10/2015	Research Travel Grant (HKD 5,275), Project number: RTG15/16.EG072, University Grants Committee, HKSAR
09/2014	Research Travel Grant (HKD 9,000), Project number: RTG13/14.EG288, University Grants Committee, HKSAR
09/2011	Postgraduate Students Conference Grants (HKD 49,000), Project number: PSCG12EG02, Research Grants Council, HKSAR

Publications

2022

23. B. Li, K. Kumar, I. Roy, A. V. Morozov, O. V. Emelyanova, **L. Zhang**, T. Koç, S. Belin, J. Cabana, R. Dedryvère, A. M. Abakumov, J. M. Tarascon, Capturing dynamic ligand-to-metal charge transfer with a long-lived cationic intermediate for anionic redox, *Nat. Mater.*, (2022) <https://doi.org/10.1038/s41563-022-01278-2>.
22. **L. Zhang***, E. A. Müller Gubler, C.-W. Tai, Ł. Kondracki, H. Sommer, P. Novák, M. El Kazzi, S. Trabesinger, Elucidating the humidity-induced degradation of Ni-rich layered cathodes for Li-ion batteries, *ACS Appl. Mater. Interfaces*, 14 (2022) 13240–13249.
21. W. Zhao, L. Zou, **L. Zhang**, X. Fan, F. Pagani, E. Brack, L. Seidl, X. Ou, K. Egorov, G. Hu, S. Trabesinger, C. Wang, C. Battaglia, Assessing long-term cycling stability of single-crystal vs polycrystalline nickel-rich NCM in pouch cell with 6 mAh cm⁻² electrodes, *Small*, (2022)

<https://doi.org/10.1002/sml.202107357>.

20. L. Li, J. Wang, **L. Zhang**, H. Duan, Y. Deng, G. Chen, Rational design of a heterogeneous double-layered composite solid electrolyte *via* synergistic strategies of asymmetric polymer matrices and functional additives to enable 4.5 V all-solid-state lithium battery with superior performance, *Energy Storage Mater.*, 45 (2022) 1062–1073.
19. L. Seidl, R. Grissa, **L. Zhang**, S. Trabesinger, C. Battaglia, Unraveling the voltage-dependent oxidation mechanisms of poly(ethylene oxide)-based solid electrolytes for solid-state batteries, *Adv. Mater. Interfaces*, 9 (2021) 2100704.

2021

18. B. Li, M. T. Sougrati, G. Rousse, A. V. Morozov, R. Dedryvère, A. Iadecola, **L. Zhang**, M. L. Doublet, A. M. Abakumov, J. M. Tarascon, Correlating ligand-to-metal charge transfer with voltage hysteresis in a Li-rich rock-salt compound exhibiting anionic redox, *Nat. Chem.*, 13 (2021) 1070–1080.
17. **L. Zhang***, C. Tsolakidou, S. Mariyappan, J. M. Tarascon, S. Trabesinger, Unraveling gas evolution in sodium batteries by online electrochemical mass spectrometry, *Energy Storage Mater.*, 42 (2021) 12–21.
16. P. Desai, J. Huang, J. Hijazi, **L. Zhang**, S. Mariyappan, J. M. Tarascon, Deciphering interfacial reactions *via* optical sensing to tune the interphase chemistry for optimized Na-ion electrolyte formulation, *Adv. Energy Mater.*, 11 (2021) 2101490.
15. Q. Wang, S. Mariyappan, G. Rousse, A. V. Morozov, B. Porcheron, R. Dedryvère, J. Wu, W. Yang, **L. Zhang**, M. Chakir, M. Avdeev, M. Deschamps, Y.S. Yu, J. Cabana, M. L. Doublet, A. M. Abakumov, J. M. Tarascon, Unlocking anionic redox activity in O3-type sodium 3d layered oxides *via* Li substitution, *Nat. Mater.*, 20 (2021) 353–361.

2020

14. W. Yin, A. Grimaud, G. Rousse, A. M. Abakumov, A. Senyshyn, **L. Zhang**, S. Trabesinger, A. Iadecola, D. Foix, D. Giaume, J. M. Tarascon, Structural evolution at the oxidative and reductive limits in the first electrochemical cycle of $\text{Li}_{1.2}\text{Ni}_{0.13}\text{Mn}_{0.54}\text{Co}_{0.13}\text{O}_2$, *Nat. Comm.*, 11 (2020) 1252.
13. M. Ting, M. Burigana, **L. Zhang**, F. Y. Zou, S. Trabesinger, A. Jonderian, E. McCalla, Impact of nickel substitution into model Li-rich oxide cathode materials for Li-ion batteries, *Chem. Mater.*, 32 (2020) 849–857.

2019

12. K. Lemoine, **L. Zhang**, J. M. Grenèche, A. Hémon-Ribaud, M. Leblanc, A. Guet, C. Galven, J. M. Tarascon, V. Maisonneuve, J. Lhoste, New amorphous iron-based oxyfluorides as cathode materials for high-capacity lithium-ion batteries, *J. Phys. Chem. C*, 123 (2019) 21386–21394.
11. Y. Yang, S. Wang, **L. Zhang**, Y. Deng, H. Xu, X. Qin, G. Chen, CoS-interposed and Ketjen black-embedded carbon nanofiber framework as a separator modulation for high performance Li-S batteries, *Chem. Eng. J.*, 369 (2019) 77–86.

10. K. Lemoine, **L. Zhang**, D. Dambournet, J. M. Grenèche, A. Hémon-Ribaud, M. Leblanc, O. Borkiewicz, J. M. Tarascon, V. Maisonneuve, J. Lhoste, Synthesis by thermal decomposition of two iron hydroxyfluorides: structural effects of Li insertion, *Chem. Mater.*, 31 (2019) 4246–4257.

2018

9. C. Yang, M. Batuk, Q. Jacquet, G. Rousse, W. Yin, **L. Zhang**, J. Hadermann, A. M. Abakumov, G. Cibir, A. Chadwick, J. M. Tarascon, A. Grimaud, Revealing pH-dependent activities and surface instabilities for Ni-based electrocatalysts during the oxygen evolution reaction, *ACS Energy Lett.*, 3 (2018) 2884–2890.
8. Y. Yang, **L. Zhang**, H. Xu, X. Qin, Y. Deng, G. Chen, Net-structured filter of Co(OH)₂-anchored carbon nanofibers with Ketjen black for high performance Li-S batteries, *ACS Sustain. Chem. Eng.*, 6 (2018) 17099–17107.
7. **L. Zhang**, D. Dambournet, A. Iadecola, D. Batuk, O. Borkiewicz, K. M. Wiaderek, E. Salager, M. Shao, G. Chen, J. M. Tarascon, Origin of the high capacity manganese-based oxyfluoride electrodes for rechargeable batteries, *Chem. Mater.*, 30 (2018) 5362–5372.

2017

6. C. Yang, C. Laberty-Robert, D. Batuk, G. Cibir, A. V. Chadwick, V. Pimenta, W. Yin, **L. Zhang**, J. M. Tarascon, A. Grimaud, Phosphate ion functionalization of perovskite surfaces for enhanced oxygen evolution reaction, *J. Phys. Chem. Lett.*, 8 (2017) 3466–3472.
5. **L. Zhang**, D. Batuk, G. Chen, J. M. Tarascon, Electrochemically activated MnO as a cathode material for sodium-ion batteries, *Electrochem. Commun.*, 77 (2017) 81–84.
4. **L. Zhang**, G. Chen, E. J. Berg, J. M. Tarascon, Triggering the *in situ* electrochemical formation of high capacity cathode material from MnO, *Adv. Energy Mater.*, 7 (2017) 1602200.

2015

3. **L. Zhang**, J. M. Tarascon, M. T. Sougrati, G. Rousse, G. Chen, Influence of relative humidity on the structure and electrochemical performance of sustainable LiFeSO₄F electrodes for Li-ion batteries, *J. Mater. Chem. A*, 3 (2015) 16988–16997.

2011

2. Y. Deng, Q. Zhang, S. Tang, **L. Zhang**, S. Deng, Z. Shi, G. Chen, One-pot synthesis of ZnFe₂O₄/C hollow spheres as superior anode materials for lithium ion batteries, *Chem. Commun.*, 47 (2011) 6828–6830.
1. Y. Deng, S. Tang, Q. Zhang, Z. Shi, **L. Zhang**, S. Zhan, G. Chen, Controllable synthesis of spinel nano-ZnMn₂O₄ *via* a single source precursor route and its high capacity retention as anode material for lithium ion batteries, *J. Mater. Chem.*, 21 (2011) 11987–11995.

Unpublished manuscripts

3. L. Li, H. Duan, **L. Zhang**, Y. Deng, G. Chen, Optimized functional additive enabled stable cathode and anode interfaces for high-voltage all-solid-state lithium batteries with significantly improved cycling performance, *submitted*.
2. F. Jeschull, **L. Zhang**, Ł. Kondracki, F. Scott, S. Trabesinger, Impact of increased proton concentration on Si interphase formation with carboxylic acids as slurry additives for Si electrodes, *submitted*.
1. A. V. Morozov, I. A. Moiseev, A. A. Savina, A. O. Boev, D. A. Aksyonov, **L. Zhang**, P. A. Morozova, V. A. Nikitina, E. M. Pazhetnov, E. J. Berg, S. S. Fedotov, J. M. Tarascon, E. V. Antipov, A. M. Abakumov, Retardation of structure densification by increasing covalency in Li-rich layered oxide positive electrodes for Li-ion batteries, *submitted*.

Presentations

Oral (presenter)

9. **L. Zhang**, C. Tsolakidou, S. Mariyappan, J. M. Tarascon, S. Trabesinger, Elucidation of gas evolution in model sodium cells by online electrochemical mass spectrometry, **contributed talk (virtual)**, The 240th Electrochemical Society (ECS) Meeting, Orlando, USA, 2021.
8. **L. Zhang**, C. Tsolakidou, S. Mariyappan, J. M. Tarascon, S. Trabesinger, Tracking gas evolution in Na-ion battery by online electrochemical mass spectrometry, **keynote presentation**, The 72nd Annual Meeting of the International Society of Electrochemistry (ISE), Jeju, Korea, 2021.
7. **L. Zhang**, C. Tsolakidou, Q. Wang, J. M. Tarascon, S. Trabesinger, Interphasial stability of Na system by *operando* gas analysis, **contributed talk (virtual)**, The Swiss Competence Center for Energy Research Meeting, Dübendorf, Switzerland, 2020.
6. **L. Zhang**, C. Bolli, M. El Kazzi, C. W. Tai, E. Müller, H. Sommer, P. Novák, S. Trabesinger, Humidity-induced degradation and surface reconstruction of Ni-rich layered oxides, **contributed talk**, The Materials Research Society (MRS) Fall meeting, Boston, USA, 2019.
5. **L. Zhang**, C. Bolli, H. Sommer, M. El Kazzi, P. Novák, S. Trabesinger, Elucidating degradation of Ni-rich layered oxides in humid environment, **contributed talk**, The 9th Lithium Battery Discussions (LIBD), Arcachon, France, 2019.
4. **L. Zhang**, C. Bolli, H. Sommer, P. Novák, S. Trabesinger, Degradation of Ni-rich layered oxides in humid environment, **contributed talk**, The 2nd Swiss Battery Days, Dübendorf, Switzerland, 2019.
3. **L. Zhang**, M. Shao, J. M. Tarascon, G. Chen, Understanding the *in situ* fluorination of high capacity cathode materials for rechargeable batteries, **invited talk**, Nature Conference on Materials Electrochemistry, Shenzhen, China, 2018.
2. **L. Zhang**, G. Chen, J. M. Tarascon, *In situ* fluorination of metal oxide cathodes, **contributed talk**, The Biannual Meeting of the French Research Network on Electrochemical Energy Storage (RS2E), Amiens, France, 2017.

1. **L. Zhang**, J. M. Tarascon, G. Chen, Impact of relative humidity on sulfate-based cathode materials, **contributed talk**, The 66th Annual Meeting of the International Society of

Electrochemistry (ISE), Taipei, Taiwan, 2015.

Poster

6. J. Yik, **L. Zhang**, J. Sjölund, E. Berg, Towards data-driven optimization of aqueous lithium-ion electrolyte additives with automated robotic system, **contributed poster**, The 32nd International Society of Electrochemistry Topical Meeting, Stockholm, Sweden, 2022.
5. **L. Zhang**, C. Tsolakidou, S. Trabesinger, *Operando* gas analysis in Na-ion cells, **contributed poster**, The 8th Symposium of the Swiss Competence Center for Energy Research–Heat and Electricity Storage (SCCER–HaE), Dübendorf, Switzerland, 2019.
4. C. Bolli, **L. Zhang**, M. Goktas, M. He, A. Gueguen, M. Mendez, P. Novák, P. Adelhelm, E. J. Berg, S. Trabesinger, Online electrochemical mass spectrometry for Li- and Na-ion batteries, **contributed poster**, The 2nd Swiss Battery Days, Dübendorf, Switzerland, 2019.
3. **L. Zhang**, G. Chen, J. M. Tarascon, Triggering the *in situ* electrochemical formation of high energy density cathode material from MnO, **contributed poster**, The 18th International Meeting on Lithium Batteries (IMLB), Chicago, USA, 2016.
2. **L. Zhang**, J. M. Tarascon, G. Chen, Influence of humidity on the handling of LiFeSO₄F electrode for Li-ion batteries, **contributed poster**, The 5th Lithium Battery Discussions (LIBD), Arcachon, France, 2015.
1. **L. Zhang**, G. Chen, Systematic syntheses of LiFeSO₄F as a novel cathode material for Li-ion batteries, **contributed poster**, The 65th Annual Meeting of the International Society of Electrochemistry (ISE), Lausanne, Switzerland, 2015.

Invited talk

Seminar at the School of Materials, Sun Yat-sen University

Title: Online electrochemical mass spectrometry: an advanced operando gas analysis technique

Date: May 13, 2021

Inviter: Prof. Chunzhen Yang, Sun Yat-sen University, China

Seminar at the CRISMAT Crystallography and Materials Sciences Laboratory, CNRS

Title: Developing advanced characterization tools to monitor battery interfacial reactions in real time

Date: December 8, 2020

Inviter: Dr. Valerie Pralong, CNRS, France

Patents

1. Y. Deng, G. Chen, **L. Zhang**, Q. Zhang, Z. Shi, Method for preparing lithium ion battery negative electrode material ZnMn₂O₄, Chinese Patent, Publication No. CN102010010B.
1. Z. Shi, Y. Deng, G. Chen, Q. Zhang, **L. Zhang**, One-pot synthesis of ZnFe₂O₄/C hollow spheres composites anode material, Chinese Patent, Publication No. CN102208637.

Computer and Language Skills

ASPEN Plus, OriginLab, Microsoft Office, Autodesk Inventor

Mandarin (native), English and Cantonese (fluent), French and German (intermediate), Swedish (beginner)

Academic References

Prof. Guohua Chen

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