

Curriculum Vitae

Sung-Kyun Jung

School of Energy and Chemical Engineering

Ulsan National Institute of Science and Technology (UNIST), Ulsan, Korea

Mobile: +82-10-8814-6089

Email: skjung@unist.ac.kr

Homepage: <https://sites.google.com/view/skjung>

Social Network & Academic Record: [LinkedIn](#) / [Google Scholar](#) / [ORCID](#)



Education

2014. 03-2018. 08: Ph. D. Materials Science and Engineering, Seoul National University, Seoul, Korea

Thesis: “Nanocomposite cathode of lithium and transition metal compounds for lithium secondary batteries”

2012. 03-2014. 02: M.S., Materials Science and Engineering, Seoul National University, Seoul, Korea

Thesis: “Understanding the degradation mechanisms of layered lithium nickel-cobalt-manganese oxides as a cathode material for lithium-ion batteries”

2008. 03-2012. 02: B.S., Materials Science and Engineering, Seoul National University, Seoul, Korea

Experience

2021. 06-Current: Assistant Professor, School of Energy and Chemical Engineering, Ulsan National Institute of Science and Technology (UNIST), Ulsan, Korea

2018. 09-2021. 05: Staff Researcher, Samsung Advanced Institute of Technology, Samsung Electronics, Suwon, Korea

Research Theme:

- (1) Design of new solid electrolyte for all-solid-state batteries
- (2) Analysis on cathode-solid electrolyte interface in all-solid-state batteries

2017. 10-2018. 02: Visiting Scholar, Advanced Light Source, Lawrence Berkeley National Laboratory, Berkeley, California, USA

Research Theme:

- (1) Energy storage mechanism study on cathode material for Li-ion batteries using Scanning Transmission X-ray Microscopy (STXM) and Ptychography

Selected Publication List

1. *Advanced Energy Materials* (2023) 2203861, "[Organic-additive-derived cathode electrolyte interphase layer mitigating intertwined chemical and mechanical degradation for sulfide-based solid-state batteries](#)"
2. *Nature Communications* **13** (2022) 7638, "[Unlocking the hidden chemical space in cubic-phase garnet solid electrolyte for efficient quasi-all-solid-state lithium batteries](#)"
3. *Advanced Functional Materials* **32** (2022) 2108790, "[Unveiling the role of transition-metal ion in the thermal degradation of layered Ni–Co–Mn cathodes for lithium rechargeable batteries](#)"
4. *ACS Energy Letters* **6** (2021) 2006, "[Pliable Lithium Superionic Conductor for All-Solid-State Batteries](#)"
5. *Advanced Materials* **33** (2021) 2004902, "[A Biodegradable Secondary Battery and its Biodegradation Mechanism for Eco-Friendly Energy-Storage Systems](#)"
6. *Advanced Energy Materials*, (2019) 1900503, "[Chemical Origins of Electrochemical Overpotential in Surface-Conversion Nanocomposite Cathodes](#)"
7. *Nature Energy* **2** (2017) 16208, "[Lithium-free transition metal monoxides for positive electrodes in lithium ion batteries](#)"
8. *Advanced Energy Materials* **4** (2014) 1-7, "[Understanding the degradation mechanisms of \$\text{LiNi}_{0.5}\text{Co}_{0.2}\text{Mn}_{0.3}\text{O}_2\$ cathode material in lithium ion battery](#)"

Full Publication List

First & Corresponding Author

1. Sangpyo Lee, Youngkyung Kim, Chanhun Park, Jihye Kim, Chang Ju Lee, Jae-Seung Kim, Sinho Choi, and **Sung-Kyun Jung***, "Cathode-Halide solid electrolyte interplay enhancing thermal stability of charged cathode material in All-Solid-State-Batteries", Submitted.
2. Wonmi Lee[†], Taegyun Yu[†], Juho Lee, Sungbin Jang, Juhee Kim, Yujin Han, Sunghun Choi, Sinho Choi, Taehee Kim, Sang-Hoon Park, Wooyoung Jin, Gyujin Song, Daeil Kim, Bo-Yun Jang, Dong-Hwa Seo, **Sung-Kyun Jung***, and Jinsoo Kim*, "[Ultimate design principles and fabrication process for high-energy-density solid-state pouch cells based on solid polymer electrolytes](#)", Preprint in Research Square, In revision (*Nature Communications*)
3. Suyeon Oh[†], A-Re Jeon[†], Gukhyun Lim, Min Kyung Cho, Keun Hwa Chae, Seok Su Sohn, Minah Lee, **Sung-Kyun Jung***, and Jihyun Hong*, "Deciphering effect of fast charging and fast discharging on cycle life of $\text{LiNi}_{0.6}\text{Mn}_{0.2}\text{Co}_{0.2}\text{O}_2$ cathodes in rechargeable lithium batteries", *Energy Storage Materials* Accepted
4. Sawankumar V. Patel[†], Valentina Lacivita^{†,*}, Haoyu Liu[†], Erica Truong, Yongkang Jin, Eric Wang, Lincoln Miara, Ryounghee Kim, Hyeokjo Gwon, **Sung-Kyun Jung***, and Yan-Yan Hu*, "[Charge-](#)

[Clustering Induced Fast Ion Conduction in 2LiX-GaF₃: A Novel Strategy for Electrolyte Design](#)", *Science Advances* **9** (2023) eadj9930

5. Taewon Kim[†], Sang Hyeok Ahn[†], You-Yeob Song[†], Beom Jin Park, Chanhee Lee, Ahreum Choi, Min-Ho Kim, Dong-Hwa Seo^{*}, **Sung-Kyun Jung^{*}**, and Hyun-Wook Lee^{*}, "[Prussian blue-type sodium-ion conducting solid electrolytes for all solid-state batteries](#)", *Angewandte Chemie International Edition* **62** (2023) e202309852
6. Kyung Oh Kim, Sang-Hoon Park, Ji Haeng Yu, Bo-Yun Jang, Chanhun Park, Hye Woo Noh, **Sung-Kyun Jung^{*}**, and Yu Jin Han^{*}, "[Cathode electrode architecture with facile ion percolating network assuring interfacial integrity for high-performance solid-state batteries](#)", *Chemical Engineering Journal* **470** (2023) 144292
7. Chanhun Park, Juho Lee, Sangpyo Lee, Yu Jin Han, Jinsoo Kim^{*}, and **Sung-Kyun Jung^{*}**, "[Organic-additive-derived cathode electrolyte interphase layer mitigating intertwined chemical and mechanical degradation for sulfide-based solid-state batteries](#)", *Advanced Energy Materials* (2023) 2203861
8. **Sung-Kyun Jung^{†,*}**, Hyeokjo Gwon^{†,*}, Hyungsub Kim, Gabin Yoon, Dongki Shin, Jihyun Hong, Changhoon Jung, and Ju-Sik Kim, "[Unlocking the hidden chemical space in cubic-phase garnet solid electrolyte for efficient quasi-all-solid-state lithium batteries](#)", *Nature Communications* **13** (2022) 7638
9. Jungmin Kang, Jinho Ahn, Hyunyoung Park, Wonseok Ko, Yongseok Lee, Seokjin Lee, Sangyeop Lee, **Sung-Kyun Jung^{*}**, and Jongsoon Kim^{*}, "[Highly Stable Fe²⁺/Ti³⁺-Based Fluoride Cathode Enabling Low-Cost and High-Performance Na-Ion Batteries](#)", *Advanced Functional Materials* **32** (2022) 2201816
10. **Sung-Kyun Jung^{†,*}**, Hyungsub Kim[†], Seok Hyun Song, Seongsu Lee, Jongsoon Kim, and Kisuk Kang^{*}, "[Unveiling the role of transition-metal ion in the thermal degradation of layered Ni–Co–Mn cathodes for lithium rechargeable batteries](#)", *Advanced Functional Materials* **32** (2022) 2108790
11. **Sung-Kyun Jung^{†,*}**, Hyeokjo Gwon^{†,*}, Gabin Yoon, Lincoln J. Miara, Valentina Lacivita, and Ju-Sik Kim, "[Pliable Lithium Superionic Conductor for All-Solid-State Batteries](#)", *ACS Energy Letters* **6** (2021) 2006
12. Myeong Hwan Lee[†], Jongha Lee[†], **Sung-Kyun Jung[†]**, Dayoung Kang[†], Myung Soo Park, Gi Doo Cha, Kyoung Won Cho, Jun-Hyuk Song, Sehwan Moon, Young Soo Yun, Seok Joo Kim, Young Woon Lim, Dae-Hyeong Kim^{*}, and Kisuk Kang^{*}, "[A Biodegradable Secondary Battery and its Biodegradation Mechanism for Eco-Friendly Energy-Storage Systems](#)", *Advanced Materials* **33** (2021) 2004902
13. **Sung-Kyun Jung[†]**, Insang Hwang[†], Donghee Chang[†], Kyu-Young Park[†], Sung Joo Kim, Won Mo Seong, Donggun Eum, Jooha Park, Byunghoon Kim, Jihyeon Kim, Jae Hoon Heo, Kisuk Kang^{*}, "[Nanoscale Phenomena in Lithium-Ion Batteries](#)", *Chemical Reviews* **120** (2020) 6684
14. **Sung-Kyun Jung[†]**, Hyeokjo Gwon[†], Seok-Soo Lee, Hyunseok Kim, Jae Cheol Lee, Jae Gwan Chung, Seong Yong Park, Yuichi Aihara, Dongmin Im^{*}, "[Understanding the effects of chemical](#)

- [reactions at the cathode–electrolyte interface in sulfide based all-solid-state batteries](#)”, *Journal of Materials Chemistry A*, **7** (2019) 22967
15. **Sung-Kyun Jung**[†], Insang Hwang[†], Il Rok Choi[†], Gabin Yoon, Joo Ha Park, Kyu-Young Park, and Kisuk Kang*, “[Chemical Origins of Electrochemical Overpotential in Surface-Conversion Nanocomposite Cathodes](#)”, *Advanced Energy Materials*, (2019) 1900503
 16. **Sung-Kyun Jung**, Insang Hwang, Sung-Pyo Cho, Kyungbae Oh, Kyojin Ku, Il Rok Choi, and Kisuk Kang*, “[New iron-based intercalation host for lithium ion batteries](#)”, *Chemistry of Materials*, **30** (2018) 1956
 17. **Sung-Kyun Jung**, Hyunchul Kim, Min Gee Cho, Sung-Pyo Cho, Byungju Lee, Hyungsub Kim, Young-Uk Park, Ji Hyun Hong, Kyu-Young Park, Gabin Yoon, Won Mo Seong, Yongbeom Cho, Myoung Hwan Oh, Haegyeom Kim, Hyeokjo Gwon, Insang Hwang, Taeghwan Hyeon, Won-Sub Yoon*, Kisuk Kang*, “[Lithium-free transition metal monoxides for positive electrodes in lithium ion batteries](#)”, *Nature Energy* **2** (2017) 16208
 18. Ji Hyun Hong[†], Hyeokjo Gwon[†], **Sung-Kyun Jung**[†], Kyojin Ku[†], and Kisuk Kang*, “[Review - Lithium-Excess Layered Cathodes for Lithium Rechargeable Batteries](#)”, *Journal of the Electrochemical Society* **162** (2015) A2447-A2467
 19. **Sung-Kyun Jung**, Hyeokjo Gwon, Ji Hyun Hong, Kyu-Young Park, Dong-Hwa Seo, Haegyeom Kim, Jangsuk Hyun, and Kisuk Kang*, “[Understanding the degradation mechanisms of LiNi_{0.5}Co_{0.2}Mn_{0.3}O₂ cathode material in lithium ion battery](#)”, *Advanced Energy Materials* **4** (2014) 1-7
 20. **Sung-Kyun Jung**, and Kisuk Kang*, “[Battery cathodes: Simultaneous anionic and cationic redox](#)”, *Nature Energy*, **2** (2017) 912-913

Contributing Author

21. Sewon Kim[†], Gabin Yoon[†], **Sung-Kyun Jung**, SeonTae Park, Ju-Sik Kim, Kyungho Yoon, Sunyoung Lee, Kisuk Kang*, “[High-Power Hybrid Solid-State Lithium–Metal Batteries Enabled by Preferred Directional Lithium Growth Mechanism](#)”, *ACS Energy Letters* **8** (2023) 9
22. Jaehoon Heo, **Sung-Kyun Jung**, Insang Hwang, Sung-Pyo Cho, Donggun Eum, Hyeokjun Park, Jun-Hyuk Song, Seungju Yu, Kyungbae Oh, Giyun Kwon, Taehyun Hwang, Kun-Hee Ko, Kisuk Kang*, “[Amorphous iron fluorosulfate as a high-capacity cathode utilizing combined intercalation and conversion reactions with unexpectedly high reversibility](#)”, *Nature Energy* **8** (2023) 30
23. Sewon Kim[†], Ju-Sik Kim^{†*}, Lincoln Miara, Yan Wang, **Sung-Kyun Jung**, Seong Yong Park, Zhen Song, Hyungsub Kim, Michael Badding, JaeMyung Chang, Victor Roev, Gabin Yoon, Ryounghee Kim, Jung-Hwa Kim, Kyungho Yoon, Dongmin Im*, and Kisuk Kang*, “[High-energy and durable lithium metal batteries using garnet-type solid electrolytes with tailored lithium-metal compatibility](#)”, *Nature Communications* **13** (2022) 1883

24. Seok Hyun Song, Moses Cho, Inchul Park, Jong-Gyu Yoo, Kyung-Tae Ko, Jihyun Hong, Jongsoon Kim, **Sung-Kyun Jung**, Maxim Avdeev, Sungdae Ji, Seongsu Lee, Joona Bang, Hyungsub Kim*, “[High-Voltage-Driven Surface Structuring and Electrochemical Stabilization of Ni-Rich Layered Cathode Materials for Li Rechargeable Batteries](#)”, *Advanced Energy Materials* **10** (2020) 2000521
25. 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, and Kisuk Kang*, “[Voltage decay and redox asymmetry mitigation by reversible cation migration in lithium-rich layered oxide electrodes](#)”, *Nature Materials* **19** (2020) 419
26. Kyojin Ku, Byunghoon Kim, **Sung-Kyun Jung**, Yue Gong, Donggun Eum, Gabin Yoon, Kyu-Young Park, Jihyun Hong, Sung-Pyo Cho, Do-Hoon Kim, Hyungsub Kim, Eunsuk Jeong, Lin Gu, Kisuk Kang*, “[A new lithium diffusion model in layered oxides based on asymmetric but reversible transition metal migration](#)”, *Energy & Environmental Science* **13** (2020) 1269
27. Insang Hwang, **Sung-Kyun Jung**, Sung-Pyo Cho, Kisuk Kang*, “[In operando formation of new iron-oxyfluoride host structure for Na-ion storage from NaF–FeO nanocomposite](#)”, *Energy Storage Materials* **23** (2019) 427
28. Sechan Lee, Jihyun Hong, **Sung-Kyun Jung**, Kyojin Ku, Giyun Kwon, Won Mo Seong, Hyungsub Kim, Gabin Yoon, Inyeong Kang, Kootak Hong, Ho Won Jang, and Kisuk Kang*, “[Charge-transfer complexes for high-power organic rechargeable batteries](#)”, *Energy Storage Materials* **20** (2019) 462
29. Won Mo Seong, Kyungho Yoon, Myeong Hwan Lee, **Sung-Kyun Jung**, and Kisuk Kang*, “[Unveiling the Intrinsic Cycle Reversibility of a LiCoO₂ Electrode at 4.8-V Cutoff Voltage through Subtractive Surface Modification for Lithium-Ion Batteries](#)”, *Nano Letters* **19** (2019) 29-37
30. Giyun Kwon, Sechan Lee, Jinyeon Hwang, Hyun-Soo Shim, Byungju Lee, Myeong Hwan Lee, Youngmin Ko, **Sung-Kyun Jung**, Kyojin Ku, Jihyun Hong, and Kisuk Kang*, “[Multi-redox Molecule for High-Energy Redox Flow Batteries](#)”, *Joule* **2** (2018) 1771-1782
31. Kyojin Ku, Jihyun Hong, Hyungsub Kim, Hyeokjun Park, Won Mo Seong, **Sung-Kyun Jung**, Gabin Yoon, Kyu-Young Park, Haegyeom Kim, and Kisuk Kang*, “[Suppression of Voltage Decay through Manganese Deactivation and Nickel Redox Buffering in High-Energy Layered Lithium-Rich Electrodes](#)”, *Advanced Energy Materials* **8** (2018) 1800606
32. Sechan Lee[†], Giyun Kwon[†], Kyojin Ku[†], Kyungho Yoon, **Sung-Kyun Jung**, Hee-Dae Lim, Kisuk Kang, “[Recent Progress in Organic Electrodes for Li and Na Rechargeable Batteries](#)”, *Advanced Materials*, **30** (2018) 1704682
33. Dong-Hwa Seo[†], Kyu-Young Park[†], Haegyeom Kim[†], **Sung-Kyun Jung**, Min-Sik Park, and Kisuk Kang*, “[Intrinsic nano-domains in triplite LiFeSO₄F and its implication in lithium ion diffusion](#)”, *Advanced Energy Materials*, **8** (2018) 1701408

34. Insang Hwang, **Sung-Kyun Jung**, Eun-Suk Jeong, Hyunchul Kim, Sung-Pyo Cho, Kyojin Ku, Hyungsub Kim, Won-Sub Yoon, and Kisuk Kang*, “[NaF-FeF₂ nanocomposite: a new type of Na-ion battery cathode material](#)”, *Nano Research*, **10** (2017) 4388-4397
35. Yongbeom Cho, Myeong Hwan Lee, Hyungsub Kim, Kyojin Ku, Gabin Yoon, **Sung-Kyun Jung**, Byungju Lee, Jongsoon Kim, and Kisuk Kang*, “[Activating layered LiNi_{0.5}Co_{0.2}Mn_{0.3}O₂ as a host for Mg intercalation in rechargeable Mg batteries](#)”, *Materials Research Bulletin*, **96** (2017) 524-532
36. Jongsoon Kim[†], Dong-Hwa Seo[†], Hyungsub Kim, Inchul Park, Jung-Keun Yoo, **Sung-Kyun Jung**, Young-Uk Park, William A. Goddard III, and Kisuk Kang*, “[Unexpected discovery of low-cost maricite NaFePO₄ as a high-performance electrode for Na-ion batteries](#)”, *Energy & Environmental Science*, **8** (2015) 540-545
37. Hyungsub Kim[†], Gabin Yoon[†], Inchul Park, Kyu-Young Park, Byungju Lee, Jongsoon Kim, Young-Uk Park, **Sung-Kyun Jung**, Hee-Dae Lim, Docheon Ahn, Seongsu Lee and Kisuk Kang*, “[Anomalous Jahn-Teller behavior in manganese-based mixed-phosphate cathode for sodium ion batteries](#)”, *Energy & Environmental Science*, **8** (2015) 3325-3335
38. Haegyeom Kim, Kyu-Young Park, Min-Young Cho, Mok-Hwa Kim, Jihyun Hong, **Sung-Kyun Jung**, Kwang Chul Roh, and Kisuk Kang*, “[High-performance hybrid supercapacitor based on graphene-wrapped Li₄Ti₅O₁₂ and activated carbon](#)”, *ChemElectroChem* **1** (2014) 125-130
39. Hee-Dae Lim, Hyelynn Song, Hyeokjo Gwon, Kyu-Young Park, Jinsoo Kim, Youngjoon Bae, Hyungsub Kim, **Sung-Kyun Jung**, Taewoo Kim, Yong Hyup Kim, Xavier Lepro, Raquel Ovalle-Robles, Ray H. Baughman and Kisuk Kang*, “[A New Catalyst-embedded Hierarchical Air Electrode for High-performance Li-O₂ Batteries](#)”, *Energy & Environmental Science* **6** (2013) 3570-3575

[†] These authors contributed equally to this work.

* Corresponding Author

Awards

1. 2023 Posco Science Fellowship, **Sung-Kyun Jung**
2. 2018 Korea Synchrotron Radiation User's Association New Scientist Awards, **Sung-Kyun Jung**
3. 2017 Capstone Design Festival Prime Minister's Award (First prize), **Sung-Kyun Jung** and Il Rok Choi
4. 2016 International Conference on Electronic Materials and Nanotechnology for Green Environment Best Poster Award, “Metal monoxides for cathode materials in lithium ion batteries”, **Sung-Kyun Jung**, Hyunchul Kim, Min Gee Cho, Taeghwan Hyeon, Won-Sub Yoon,

Kisuk Kang

5. 2014 Korea Electrochemical Society Fall Meeting Poster Award, “Pteridine redox centers as organic electrodes for rechargeable batteries”, Jihyun Hong, Minah Lee, Byungju Lee, **Sung-Kyun Jung**, Chan-Beum Park, Kisuk Kang

Presentations

International

1. **Sung-Kyun Jung**, “Diagnosis and solution of intertwined degradation at cathode/solid electrolyte interface in solid-state batteries”, *7th International Conference on Advanced Electromaterials (ICAE 2023)*, November 2023 (**Oral, Invited**)
2. **Sung-Kyun Jung**, “Diagnosis and solution of intertwined degradation at cathode/solid electrolyte interface in solid-state batteries”, *The 20th International Microscopy Congress (IMC20)*, September 2023 (**Oral, Invited**)
3. **Sung-Kyun Jung**, “Design of cathode materials for Li-ion batteries using nanocomposite: Decoupled lithium and electron storage or host formation reaction”, *Nano Korea 2023*, July 2023 (**Oral, Invited**)
4. **Sung-Kyun Jung**, “Unlocking the hidden chemical space in cubic phase garnet solid electrolyte for long-term stable solid-state batteries”, *2023 MRS Spring Meeting & Exhibit*, April 2023. (**Oral**)
5. **Sung-Kyun Jung**, “Identification of the role of atomic species in the thermal degradation of layered Ni-Co-Mn cathodes for lithium rechargeable batteries”, *2022 International Conference on Neutron Scattering*, August 2022. (**Oral, Online, Invited**)
6. **Sung-Kyun Jung**, “Analysis and design of cathode-solid electrolyte interface for all-solid-state-batteries”, *Materials Challenges in Alternative and Renewable Energy (MCARE) 2022*, August 2022. (**Oral, Invited**)
7. **Sung-Kyun Jung**[†], Hyeokjo Gwon[†], Seok-Soo Lee, Hyunseok Kim, Jae Cheol Lee, Jae Gwan Chung, Seong Yong Park, Yuichi Aihara, and Dongmin Im, “Separating the effects of chemical instability from chemo-mechanical degradation at cathode-electrolyte interface in all-solid-state batteries”, *22nd International Conference on Solid State Ionics*, June 2019. (**Oral**)
8. **Sung-Kyun Jung**, Hyunchul Kim, Kyu-Young Park, Hyungsub Kim, Byungju Lee, Young-Uk Park, Haegyeom Kim, Won-Sub Yoon, and Kisuk Kang, “Redox Nanocomposite Cathode Materials for Lithium Rechargeable Batteries”, *226th Meeting of The Electrochemical Society*, Cancun, Mexico, October 2014. (**Oral**)
9. **Sung-Kyun Jung**, Hyunchul Kim, Min Gee Cho, Taeghwan Hyeon, Won-Sub Yoon*, and Kisuk Kang*, “Simple mixture cathode materials for lithium rechargeable batteries”, *2018 International Battery Association*, March 2018. (**Poster**)

10. **Sung-Kyun Jung**, Hyunchul Kim, Min Gee Cho, Taeghwan Hyeon, Won-Sub Yoon, Kisuk Kang, “Metal monoxides for cathode materials in lithium ion batteries”, *2016 International Conference on Electronic Materials and Nanotechnology for Green Environment*, November 2016. **(Poster)**
11. **Sung-Kyun Jung**, Hyeokjo Gwon, Jihyun Hong, Kyu-Young Park, Dong-Hwa Seo, Haegyeom Kim, Jangsuk Hyun, and Kisuk Kang, “Understanding the degradation mechanisms of $\text{LiNi}_{0.5}\text{Co}_{0.2}\text{Mn}_{0.3}\text{O}_2$ cathode material in lithium ion battery”, *NANO KOREA 2014 Symposium*, Seoul, Korea, July 2014. **(Poster)**

Domestic

1. **Sung-Kyun Jung**, “Analysis and design of cathode-solid electrolyte interface in all-solid-state-batteries”, *Korean Carbon Society*, Jeju, Korea, May 2023 **(Oral, Invited)**
2. **Sung-Kyun Jung**, “Introduction of solid-state batteries with inorganic solid electrolyte”, *2023 The Korean Institute of Chemical Engineers*, Busan, Korea, April 2023 **(Tutorial, Invited)**
3. **Sung-Kyun Jung**, “Cathode electrolyte interphase layer for mitigating intertwined chemical and mechanical degradation for sulfide-based solid-state batteries”, *Korean Energy Society*, Jeju, Korea, April 2023. **(Oral, Invited)**
4. **Sung-Kyun Jung**, “Unlocking the hidden chemical space in cubic-phase garnet solid electrolyte for long-term stable solid-state batteries”, *2022 The Korean Electrochemical Society Fall Meeting*, Busan, Korea, November 2022. **(Oral, Invited)**
5. **Sung-Kyun Jung**, “Cathode-Solid electrolyte interfacial analysis and design for all-solid-state batteries”, *Materials Research Society of Korea Fall Conference 2021*, Gyeongju, November 2021 (Oral, Invited)
6. **Sung-Kyun Jung**, “Cathode-Solid electrolyte interfacial analysis and design for all-solid-state batteries”, *The Korean Society of Industrial and Engineering Chemistry Fall Meeting*, Daegu, November 2021 **(Oral, Invited)**
7. **Sung-Kyun Jung**, Kisuk Kang, “Simple mixture cathode materials for lithium rechargeable batteries”, *2016 The Korean Conference on Semiconductors*, Feb 2016. **(Oral)**
8. **Sung-Kyun Jung**, Byungju Lee, Kisuk Kang, “Simple mixture cathode materials for lithium rechargeable batteries”, *2015 The Korean Society for Composite Materials*, May 2015. **(Oral)**
9. **Sung-Kyun Jung**, Hyeokjo Gwon, Jihyun Hong, Kyu-Young Park, Dong-Hwa Seo, Haegyeom Kim, Jangsuk Hyun, and Kisuk Kang, “Understanding the degradation mechanisms of $\text{LiNi}_{0.5}\text{Co}_{0.2}\text{Mn}_{0.3}\text{O}_2$ cathode material in lithium ion battery”, *2014 The Korean Electrochemical Society Fall Meeting*, Daejeon, Korea, November 2014. **(Poster)**

Patents

1. "고체 이온 전도체, 그 제조방법, 이를 포함하는 리튬전지용 콤포넌트, 음극, 리튬 전지용 세퍼레이터, 및 리튬 전지", Republic of Korea (2023), US11721834B2, US20230307702A1, KR20220015314A
2. "리튬 이차 전지용 양극 활물질 및 이의 제조방법", Republic of Korea (2023), KR 10-2023-0006537
3. "리튬 이차 전지용 양극 활물질 및 이의 제조방법", Republic of Korea (2023), KR 10-2023-0006536
4. "리튬 이차 전지용 양극 활물질 및 이의 제조방법", Republic of Korea (2023), KR 10-2023-0006535
5. "리튬 이차 전지용 양극 활물질 및 이의 제조방법", Republic of Korea (2022), KR 10-2022-0169618
6. "리튬 이차 전지용 양극 활물질 및 이의 제조방법", Republic of Korea (2022), KR 10-2022-0169617
7. "고체 전해질, 그 제조방법 및 이를 포함하는 전기화학소자", Republic of Korea (2021), KR 10-2021-0149619 A, EP 3920280 A1, CN 113764724 A, US 2021-0376378 A1, US 11677097 B2
8. "고체 전도체, 그 제조방법, 이를 포함하는 고체 전해질 및 전기화학소자", Republic of Korea (2020), KR 10-2020-0135210 A, JP 2020-194773 A, CN 111977626 A, US 2020-0373613 A1
9. "전고체 이차 전지 및 그 제조방법", Republic of Korea (2020), KR 10-2021-0113878 A, WO WO2021-182762 A1, US 2021-0280853 A1
10. "복합 고체전해질, 그 제조방법 및 이를 포함하는 전기화학전지", Republic of Korea (2020), Application number: 10-2020-0017142
11. "전고체 이차 전지 및 그 제조방법", Republic of Korea (2020), Application number: 10-2020-0029166
12. "전고체 이차전지, 및 전고체 이차전지의 제조 방법", Republic of Korea (2020), Application number: 10-2020-0030377
13. "산화물, 그 제조방법, 이를 포함하는 고체 전해질 및 전기화학소자", Republic of Korea (2019), Application number: 10-2019-0094937
14. "고체이온전도체 화합물, 이를 포함하는 고체전해질, 이를 포함하는 전기화학 셀,

및 이의 제조방법”, Republic of Korea (2019), Application number: 10-2019-0094539

15. “Composite materials for cathode materials in secondary battery, method of manufacturing the same and lithium secondary battery including the same”, Republic of Korea (2019), KR101967876B1
16. “Composite materials for cathode materials in secondary battery, method of manufacturing the same and lithium secondary battery including the same”, USA (2017), Application number: 15/410.122
17. “Composite materials for cathode materials in secondary battery, method of manufacturing the same and lithium secondary battery including the same”, China (2017), Application number: 201710038895.1
18. “Cathode active material for lithium secondary and lithium secondary batteries comprising the same”, Republic of Korea (2014), Application number: 10-2014-0196050

Grants

2023. 12-2025. 11: Research project, Posco TJ Park Foundation

2023. 01-2025. 12: Research project, Korea Institute of Machinery & Materials

2022. 12-2023. 11: Research project, National Research Council of Science and Technology

2022. 07-2026. 06: Research project, Institute of Civil-Military Technology Cooperation

2022. 04-2025. 12: Establishment of foundation, Korea Institute for Advancement of Technology

2022. 03-2025. 02: Research project, National Research Foundation of Korea

2022. 01-2024. 12: Research project, Korea Institute of Science and Technology

2021. 12-2026. 08: Research project, Korea Evaluation Institute of Industrial Technology

2021. 10-2023. 09: Research project, Chunbo

2014. 03-2017. 02: Global Ph. D. Fellowship, Granted by the National Research Foundation, Korea (NRF-2014H1A2A1021462)