

Curriculum Vitae

Youngjin Kim

- **Total SCI papers: 29 / Granted Patents: 5**
- **Total Citation: 4,115** (Google Scholar, Jan. 2, 2024)
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EDUCATION

- Sep. 2010 – Feb. 2016: **Ph.D.** in Chemical and Biological Engineering, **Seoul National University**
Dissertation: Phosphorus-based High-capacity Negative Electrode Materials for Sodium-ion Battery
Supervisor: Prof. Seung Mo Oh

CAREER

- Sep. 2022 – current: **Assistant professor**, **Department of Battery Convergence Engineering, Kangwon National University**
- Aug. 2021 – Aug. 2022: **Senior Researcher**, **Research Institute of Industrial Science and Technology (RIST)**
- Jul. 2017 – Jun. 2021: **Post. Doc.** in Mechanical Engineering, **University of Texas at Austin**
Supervisor: Prof. Arumugam Manthiram
- Mar. 2016 – Jun. 2017: **Post. Doc.** in Chemical and Biological Engineering, **Seoul National University**
Supervisor: Prof. Kyu Tae Lee

AWARDS and ACHIEVEMENTS

- **Technology Transfer** (2017) to **LG Chem. (\$80k)**
- **CAS 2017 SciFinder Future Leaders in Chemistry** (2017) from **American Chemical Society (ACS)**
- **Post-doctoral Fellowship** (2016-2017) from **National Research Foundation of Korea**
- **Best Poster Award** (2013) from **Korea Electrochemical Society**
- **Minister's Award** (2009) in Green Energy Contest from **Ministry of Education, Science and Technology, Korea**

RESEARCH INTERESTS

- **Cathode materials for Li-ion batteries:** High-Ni NCM and NCA, Co-free high-Ni cathodes, reducing for residual lithium, and single-crystal cathodes
- **Study on failure mechanism:** Bulk and surface analyses of electrode materials (transition metal dissolution and SEI stability)
- **New electrode materials for Li- and Na-ion Batteries:** New crystal structure of electrode materials
- **Li-Metal Batteries:** Failure mechanism and improvement of electrochemical characteristics for Li and Na metal

EXPERIMENTAL TECHNIQUES

- Electrochemical analyses for secondary batteries
- Surface analyses (ToF-SIMS and XPS)
- X-ray absorption spectroscopy (XAS)
- Crystal Structure Refinement (FullProf)
- The *in situ* Instrumental Analyses
- Synthesis of Inorganic Materials

PUBLICATIONS

SCI (2012~2024): 29 papers

First author: 12

- (1) **Youngjin Kim**, H. Kim, W Shin, E Jo, A. Manthiram*
"Insights into the Microstructural Engineering of Cobalt-Free, High-Nickel Cathodes Based on Surface Energy for Lithium-Ion Batteries"
Adv. Energy Mater., 13, 2204054 (2023)
- (2) **Youngjin Kim**, H. Kim, A. Manthiram*
"A kinetic study on cobalt-free high-nickel layered oxide cathode materials for practical lithium-ion batteries"
J. Power Sources, 558, 232633 (2023)
- (3) **Youngjin Kim**, H. Park, K. Shin, G. Henkelman, Jamie H. Warner, A. Manthiram*
" Rational Design of Coating Ions via Advantageous Surface Reconstruction in High-Nickel Layered Oxide Cathodes for Lithium-Ion Batteries "
Adv. Energy Mater., 11, 2101112 (2021)
- (4) **Youngjin Kim**, H. Park, A. Dolocan, Jamie H. Warner, A. Manthiram*
"Wet-CO₂ Pretreatment Process for Reducing Residual Lithium in High-Nickel Layered Oxides for Lithium-Ion Batteries"
ACS Appl. Mater. Interfaces., 13, 27096 (2021)
- (5) **Youngjin Kim**, H. Park, Jamie H. Warner, A. Manthiram*
"Unraveling the Intricacies of Residual Lithium in High-Ni Cathodes for Lithium-Ion Batteries"
ACS Energy Lett., 6, 941 (2021)
- (6) **Youngjin Kim**, W. M. Seong, A. Manthiram*
"Cobalt-free, High-nickel Layered Oxide Cathodes for Lithium-ion Batteries: Progress, Challenges, and Perspectives"
Energy Storage Mater., 34, 250 (2021)
- (7) **Youngjin Kim**, D. Koo, S. Ha, S. C. Jung, T. Yim, H. Kim, S. K. Oh, D. Kim, A. Choi, Y. Kang, K. H. Ryu, M. Jang, Y.-K. Han,* S. M. Oh,* and K. T. Lee*
"Two-Dimensional Phosphorene-Derived Protective Layers on a Lithium Metal Anode for Lithium-Oxygen Batteries"
ACS Nano, 12, 4419 (2018).

- (8) H. J. Kim,[†] **Youngjin Kim**,[†] J. Shim, K. H. Jung, K. T. Lee,* and J.-C. Lee*
 "Environmentally Sustainable Aluminum-Coordinated Poly(tetrahydroxybenzoquinone) as a Promising Cathode for Sodium Ion Batteries"
ACS Appl. Mater. Interfaces., 10, 3479 (2018).
Co-1st Author
- (9) **Youngjin Kim**, Y. Kim, Y. Park, Y. N. Jo, Y. J. Kim, N. S. Choi, K. T. Lee*
 "SnSe alloy as a Promising Anode Material for Na-ion Batteries"
Chem. Commun., 51, 50 (2015)
Selected as an Inside Cover Paper of Chem. Commun.
- (10) **Youngjin Kim**, Y. Kim, A. Choi, S. Woo, D. Mok, N. S. Choi, Y. S. Jung, J. H. Ryu, S. M. Oh*, K. T. Lee*
 "Tin Phosphide as a Promising Anode Material for Na-ion Batteries"
Adv. Mater., 26, 4139 (2014)
- (11) **Youngjin Kim**, K.H. Ha, S. M. Oh*, K. T. Lee*
 "High-capacity Anode Materials for Sodium Ion Batteries"
Chem. Eur. J., 20, 11980 (2014)
- (12) **Youngjin Kim**, Y. Park, A. Choi, N. S. Choi, J. Kim, J. Lee, J. H. Ryu, S. M. Oh*, K. T. Lee*
 "An Amorphous Red Phosphorus/Carbon Composite as a Promising Anode Material for Sodium Ion Batteries"
Adv. Mater., 25, 3045 (2013)
Selected as an Inside Cover Paper of Adv. Mater.
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Co-author: 17

- (13) H.S. Yang, D.M. Kim,, **Youngjin Kim**, Y. J. Lee, K. T. Lee*
 "Nonpolar Solvent-based Electrolytes with a Quasi-Solid-State Redox Reaction for Lithium-Sulfur Batteries"
ChemElectroChem., 8, 2321-2328 (2021). -
- (14) H. Kim, S. K. Oh, J. Lee, S. W. Doo, **Youngjin Kim**, K. T. Lee*
 "Failure mode of thick cathodes for Li-ion batteries: variation of state-of-charge along the electrode thickness direction"
Electrochim. Acta., 370, 137743 (2021).
- (15) W. M. Seong, **Youngjin Kim**, A. Manthiram*
 "Impact of Residual Lithium on the Adoption of High-nickel Layered Oxide Cathodes for Lithium-ion Batteries"
Chem. Mater., 32, 9479 (2020).
- (16) Y. Park, J. Lim, D. Mok, **Youngjin Kim**, M. Kwon, K. T. Lee*
 "Scalable Solid-State Synthesis of Self-Assembled Si Nanoparticles in Spherical Carbons through Relative Miscibility for Li-Ion Batteries"
J. Electrochem. Soc., 166, A1127 (2019).

- (17) H. Kim, A. Choi, S.W.Doo, J. Lim, **Youngjin Kim**, K. T. Lee*
 "Role of Na⁺ in the Cation Disorder of [Li_{1-x}Na_x]NiO₂ as a Cathode for Lithium-Ion Batteries"
J. Electrochem. Soc., 165, A201 (2018).
- (18) D. Kim, S. C. Jung, S. Ha, **Youngjin Kim**, Y. Park, J. H. Ryu, Y. Han, K. T. Lee*
 "Cointercalation of Mg²⁺ Ions into Graphite for Magnesium-Ion Batteries"
Chem. Mater., 30, 3199 (2018).
- (19) H.-s. Kim, S. Hwang, **Youngjin Kim**, J. H. Ryu, S. M. Oh*, K. J. Kim*
 "Bi-functional effects of lengthening aliphatic chain of phthalimide-based negative redox couple and its non-aqueous flow battery performance at stack cell"
APL Mater., 6 (2018)
- (20) H.-s. Kim, J. Kim, H. Kim, **Youngjin Kim**, J. H. Ryu, S. M. Oh*, S. Yoon*
 "Hydrothermally synthesized tin (IV) sulfide as a negative electrode for sodium-ion batteries and its sodiation mechanism"
J. Electroanal. Chem., 808, 137 (2018)
- (21) S. Ha, **Youngjin Kim**, D. Koo, K. -H. Ha, Y. Park, D.-M. Kim, S. Son, T. Yim and K. T. Lee*
 "Investigation into the stability of Li metal anodes in Li-O₂ batteries with a redox mediator"
J. Mater. Chem. A., 5, 10609 (2017)
- (22) H.-s. Kim, T. Yoon, **Youngjin Kim**, S. Hwang, J. H. Ryu, and S. M. Oh*
 "Increase of Both Solubility and Working Voltage by Acetyl Substitution on Ferrocene for Non-Aqueous Flow Battery"
Electrochem. Commun., 69, 72 (2016)
- (23) D. Kim, **Youngjin Kim**, D. Arumugam, S. W. Woo, Y. N. Jo, M.-S. Park, Y.-J. Kim, N.-S. Choi, and K. T. Lee*
 "Co-intercalation of Mg²⁺ and Na⁺ in Na_{0.69}Fe₂(CN)₆ as a High Voltage Cathode for Magnesium Batteries"
ACS Appl. Mater. Interfaces., 8, 8554 (2016)
- (24) H. Park, T. Yoon, **Youngjin Kim**, J. G. Lee, J. Kim, H. Kim, J.H. Ryu, J.J. Kim, S.M. Oh*
 "Thermal Behavior of Solid Electrolyte Interphase Films Deposited on Graphite Electrodes with Different States-of-Charge"
J. Electrochem. Soc., 162, A892 (2015).
- (25) J. Jang, S. Kim, **Youngjin Kim**, K. H. Park, J. H. Ku, J. H. Ryu, S. M. Oh
 "Electrode Performances of Amorphous Molybdenum Oxides of Different Molybdenum Valence for Lithium-ion Batteries"
Isr. J. Chem., 55, 604 (2015)
- (26) J. Y. Jang, Y. Lee, **Youngjin Kim**, J. Lee, S. Lee, K. T. Lee*, N. S. Choi*
 "Interfacial Architectures based on a Binary Additive Combination for High-performance Sn₄P₃ Anodes in Sodium-ion Batteries"
J. Mater. Chem. A, 3, 8332 (2015).
- (27) J. Jang, **Youngjin Kim**, O. B. Chae, T. Yoon, S. Kim, H. Kim, H. Park, J. H. Ryu, S. M. Oh *

"A First-Cycle Coulombic Efficiency Higher than 100 % Observed for a Li_2MO_3 (M=Mo or Ru) Electrode"
Angew. Chem. Int. Ed., 53, 10654 (2014).

- (28) S. Y. Hong, Youngjin Kim, Y. Park, A. Choi, N. S. Choi, K. T. Lee*
"Charge Carrier in Rechargeable Batteries: Na ions vs. Li ions"
Energy Environ. Sci., 6, 2067 (2013)
- (29) B. Jang, M. Park, O. B. Chae, S. Park, Youngjin Kim, S. M. Oh, Y. Piao*, T. Hyeon*
"Direct Synthesis of Self-Assembled Ferrite/Carbon Hybrid Nanosheets for High Performance Lithium-Ion Battery Anodes"
J. Am. Chem. Soc., 134, 15010 (2012).

PATENTS

Granted Patents: 6

Korean: 5, US: 1

- (1) A. Manthiram, Youngjin Kim, B. Yu
"Composite positive electrode active material for lithium secondary battery, method of preparing the same, positive electrode for lithium secondary battery including the same, and lithium secondary battery including the positive electrode"
US.11621419.B2 (2023)
- (2) J. Lee, H. Kim, J. Sim, K. T. Lee, Youngjin Kim
"Electrode Active Material and Forming Method Thereof"
KR 10-18-70563 (2018)
- (3) K. T. Lee, Youngjin Kim, S. M. Oh,
"Composite Electrode for Electrochemical Device, Method for Manufacturing The Same, and Electrochemical Device Including The Same"
KR 10-17-47402 (2017)
[Technology Transfer to LG Chem.](#)
- (4) K. T. Lee, Youngjin Kim, Y. Kim
"Negative Active Material for Sodium Rechargeable Battery and Sodium Rechargeable Battery Including The Same"
KR 10-16-61586 (2016)
[Posco\(RIST\) project](#)
- (5) S. M. Oh, H. Kim, Youngjin Kim, T. Yoon, J. H. Ryu
"Electrolyte for Redox Flow Battery and Redox Flow Battery Including Thereof"
KR 10-16-00141 (2016)
- (6) S. M. Oh, Youngjin Kim
"Negative Active Material for Sodium Ion Battery, Method of Preparing Electrode Using Thereof and Sodium Ion Battery Comprising Same"
KR 10-14-44189 (2014)
[Technology Transfer to LG Chem.](#)

Patents Pending: 3

PCT: 3

- (7) K. T. Lee, Youngjin Kim
"Composite Electrode for Electrochemical Device, Method for Manufacturing The Same, and Electrochemical Device Including The Same"
PCT/KR2016/011427 (2016)
Technology Transfer to LG Chem.

- (8) S. M. Oh, Youngjin Kim
"Negative Active Material for Sodium Ion Battery, Method of Preparing Electrode Using Thereof and Sodium Ion Battery Comprising Same"
PCT/KR2014/001220 (2014)
Technology Transfer to LG Chem.

- (9) S. M. Oh, H. Kim, Youngjin Kim, T. Yoon, J. H. Ryu, J. Jang
"Electrolyte Solution for Redox Flow Battery and Redox Flow Battery Comprising Same"
PCT/KR2014/009535 (2014)

Presentation and Invited Talks

- (1) Youngjin Kim
"Lithium-oxygen battery with a phosphorene-derived protective layer on lithium anode"
2017 ACS SciFinder Future Leaders, Columbus, OH, US (Jul, 2017)

- (2) Youngjin Kim
"Lithium-oxygen battery with a phosphorene-derived protective layer on lithium anode"
Incheon National University, Incheon, Korea (May. 29, 2017)

- (3) Youngjin Kim, H. Kim, S. K. Oh, S. M. Oh, * K. T. Lee*
"Li Metal Electrode with Electrochemically Active Protective Layers for Li-Air Batteries"
UK-Korea Symposium on Lithium and Sodium Batteries, London, UK (Jan. 18, 2016)

- (4) Youngjin Kim, A. Choi, K. T. Lee, S. M. Oh*
"Phosphorus-Based Negative Electrode Materials for Na-ion Batteries"
17th International Meeting on Lithium Batteries (IMLB), Como, Italy (Jun. 10, 2014)

- (5) Youngjin Kim, S. Jurng, H. Kim, Y. Park, O. B. Chae, J. H. Ryu, K. T. Lee*, S. M. Oh*
"Electrochemical Characteristics of Red Phosphorus-Carbon Nanocomposites as Anode Materials for Sodium Ion Batteries"
Korea Electrochemical Society meeting, Chang-won, Korea (Apr. 11, 2013)

- (6) Youngjin Kim, J. Ku, J. Jang, J. H. Ryu, S. M. Oh*
"Electrochemical and Spectroscopic Characterizations of Hydrothermally Synthesized MoO₂/Carbon Microspheres"
16th International Meeting on Lithium Batteries (IMLB), Jeju, Korea (Jun. 17, 2012)