

SEMINAR OF PROFESSORS:

Kyung Yoon Chung (Korean Institute of Science Technology)
Hyung-Seok Kim (Korean Institute of Science Technology)
Hyung-Wan Nam (Dongguk University-Seoul)

Korea

ETS. Ingenieros Industriales
Universidad Politécnica de Madrid

May 17, 11:00 Room C

Dr. Kyung Yoon CHUNG : Batteries research activities at Korea Institute of Science and Technology

Dr. Hyung-Seok KIM : Using Nanostructured materials to improve high capacity and fast charging battery materials

Prof. Kyung-Wan NAM : Exploring new electrode materials for sodium-ion batteries

Short CVs

Kyung Yoon Chung

PRESENT POSITION Head/Principal Research Scientist

Center for Energy Storage Research
Korea Institute of Science and Technology

ADDRESSES Center for Energy Storage Research

Clean Energy Institute
Korea Institute of Science and Technology
Hwarangno 14-gil 5, Seongbuk-gu, Seoul 136-791, Korea
Tel.: 82-2-958-5225 (office)
Fax.: 82-2-958-5229
E-mail: kychung@kist.re.kr

AREA OF INTEREST:

Secondary batteries, materials for energy storage system, in situ diagnostics of energy storage materials using synchrotron based X-ray techniques, energy storage system

EDUCATION:

Mar. 1998 – Feb. 2003 Yonsei University, Seoul, Korea

Ph. D. in Metallurgical Engineering

Thesis title: A Study on the Capacity Fading and the Replacement of Surface Film at the Surface of LiMn_2O_4 Thin Film Electrode

Thesis advisor: Prof. Kwang-Bum Kim

Mar. 1992 – Feb. 1998, Yonsei University, Seoul, Korea

B.S. in Metallurgical Engineering

PROFESSIONAL EXPERIENCE:

- 02/25/2003 – 01/24/2004 Research Associate
Division of Materials Science & Engineering, Yonsei University
Supervisor: Prof. Kwang-Bum Kim
&
Postdoctoral Research Scientist
Yonsei Center for Nano Technology
- 01/26/2004 – 02/15/2006 Research Associate
Chemistry Department, Brookhaven National Laboratory
Supervisor: Dr. Xiao-Qing Yang
- 03/01/2006 – 02/28/2011 Senior Research Scientist
Advanced Battery Center
Korea Institute of Science and Technology
- 03/01/2011 – 03/31/2014 Principal Research Scientist
Energy Storage Research Center
Korea Institute of Science and Technology
- 04/01/2014 – present Head/Principal Research Scientist
Center for Energy Storage Research
Korea Institute of Science and Technology

SELECTED PUBLICATIONS (SCI):

1. Lee, J. H., G. Ali, D. H. Kim and K. Y. Chung* (2017). "Metal-Organic Framework Cathodes Based on a Vanadium Hexacyanoferrate Prussian Blue Analogue for High-Performance Aqueous Rechargeable Batteries." Advanced Energy Materials **7**(2).
2. Ali, G., J. H. Lee, S. H. Oh, H. G. Jung and K. Y. Chung* (2017). "Elucidating the reaction mechanism of SnF₂@C nanocomposite as a high-capacity anode material for Na-ion batteries." Nano Energy **42**: 106-114.
3. Cho, J. H., M. Aykol, S. Kim, J. H. Ha, C. Wolverton, K. Y. Chung*, K. B. Kim and B. W. Cho (2014). "Controlling the Intercalation Chemistry to Design High-Performance Dual-Salt Hybrid Rechargeable Batteries." Journal of the American Chemical Society **136**(46): 16116-16119.
4. Ali, G., S. H. Oh, S. Y. Kim, J. Y. Kim, B. W. Cho and K. Y. Chung* (2015). "An open-framework iron fluoride and reduced graphene oxide nanocomposite as a high-capacity cathode material for Na-ion batteries." Journal of Materials Chemistry A **3**(19): 10258-10266.
5. Hwang, J. Y., S. M. Oh, S. T. Myung, K. Y. Chung, I. Belharouak and Y. K. Sun* (2015). "Radially aligned hierarchical columnar structure as a cathode material for high energy density sodium-ion batteries." Nature Communications **6**: 9.

HYUNG SEOK KIM

Office: 02-958-5281, Email: hskim0227@kist.re.kr

Education

Ph. D. Materials Science and Engineering Sept 2015
University of California at Los Angeles, Los Angeles, CA

Advisor: Prof. Bruce Dunn

Dissertation: "Inorganic nanostructure for electrochemical energy storages"

M.S. Materials Science and Engineering Aug 2009

Yonsei University, Seoul, South Korea

Advisor: Prof. Jae Chul Pyun

Dissertation: "Hyper sensitive rapid test kit using chemiluminescence reaction"

B.S. Materials Science and Engineering Aug 2006

Yonsei University, Seoul, South Korea

Experience

Senior Research Scientist (Dec 2017 – Present)
Center for Energy Storage Research, Korea Institute Science and Technology (KIST), Seoul, Korea

Portland Technology Development (PTD) Engineer (Mar 2016 – Nov 2017)
Intel Corporation, Hillsboro, OR, US

Staff Research Associate (Nov 2015 – Feb 2016)
University of California at Los Angeles, Los Angeles, CA, US

Selected Publications

- J. S. Ko, H.-S. Kim, "Lithium-and sodium-ion storage properties of modulated titanate morphologies in reduced graphene oxide nanocomposites" Appl. Surf. Sci 2018, 462, 276
- H.-S. Kim, J. B. Cook, H. Lin, J. S. Ko, S. H. Tolbert, V. Ozolins, B. Dunn, "The use of oxygen vacancies to enhance the charge storage properties of MoO₃-x" Nat. Mater. 2017, 16, 454
- J. B. Cook*, H.-S. Kim*, Y. Yan, J. S. Ko, S. Robbenolt, B. Dunn, S. H. Tolbert, "Mesoporous MoS₂ as a transition metal dichalcogenide exhibiting pseudocapacitive Li- and Na-ion charge storage" Adv. Energy Mater. 2016, 6, 1501937 (*equal contribution)
- J. B. Cook, H.-S. Kim, T. C. Lin, C.-H. Lai, B. Dunn, S. H. Tolbert, "Pseudocapacitive charge storage in thick composite MoS₂ nanocrystal-based electrodes" Adv. Energy Mater. 2016, 7, 1601283
- H.-S. Kim, J. B. Cook, S. H. Tolbert, B. Dunn, "The development of pseudocapacitive properties in nanosized-MoO₂" J. Electrochem. Soc. 2015, 162, A5083

Kyung-Wan Nam

Ph. D., Associate Professor
Depart. of Energy and Materials Engineering
Dongguk University-Seoul, Korea
Phone : 02-2260-4978
Cell phone: 010-3288-6986
Fax: 02-2268-8550
E-mail: knam@dongguk.edu
Homepage: <https://sites.google.com/site/namkwlab/>



Education:

Yonsei University, South Korea Metallurgical Engineering	B.S. 1998
Yonsei University, South Korea Metallurgical Engineering	M.S. 2000
Yonsei University, South Korea Metallurgical Engineering	Ph.D. 2005

Research and Professional Experience:

2017.09 – present	Associate Professor Depart. of Energy and Materials Engineering, Dongguk University-Seoul, Korea
2016.07 – present	Guest Scientist Chemistry Department, Brookhaven National Lab. NY, USA
2014.03 – 2017.08	Assistant Professor Depart. of Energy and Materials Engineering, Dongguk University-Seoul, Korea
2016.01 – present	Board Member, Korean Electrochemical Society
2009.09 – 2014.02	Staff Scientist/Principal Investigator Chemistry Department, Brookhaven National Lab. NY, USA
2006.09 – 2009.09	Research Associate (Post-Doc) Chemistry Department, Brookhaven National Lab. NY, USA

Awards

- 2017 Best Teaching Professor (College of Engineering), Dongguk University
- 2017 Top Paper Award in 2017 for the journal "Nano Research", "Sodium iron hexacyanoferrate with high Na content as a Na-rich cathode material for Na-ion batteries", You, Ya; Yu, Xiqian; Yin, Yaxia; Nam, Kyung-Wan*; Guo, Yu-Guo*. Nano Research, 2015, 8(1): 117–128.

Research area:

1. Electrochemical Energy Storage Materials

- Li- and Na- ion batteries
- Supercapacitors

- All-solid-state batteries
- 2. Advanced materials characterization using synchrotron X-ray techniques**
- High resolution X-ray diffraction(Rietveld Refinement)
 - X-ray absorption spectroscopy (XANES/EXAFS)
 - NEXAFS spectroscopy for polymer materials
 - *In operando* x-ray characterization of battery materials during charging/discharging
- 3. Highly porous carbon/nanocomposite materials**
- Salt-templated synthesis of highly porous carbon and Fe-N-C materials for ORR electrocatalyst
 - Salt-templated synthesis of highly porous carbon & C-MOx nanocomposite materials for supercapacitors and next generation rechargeable batteries

Selective Publications (* corresponding author):

- **96** peer reviewed papers with over **5600** total citations and **h-index = 39** (Google scholar)
1. Enyuan Hu, Xiqian Yu*, Ruoqian Lin, Xuanxuan Bi, Jun Lu*, Seongmin Bak, **Kyung-Wan Nam**, Huolin L. Xin*, Chernoy Jaye, Daniel A. Fischer, Khalil 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*, Vol. 3, pp 690–698 (2018).
 2. Deu S Bhang, Ghulam Ali, Ji-Young Kim, Kyung Yoon Chung, **Kyung-Wan Nam***, "Improving the sodium storage capacity of tunnel structured $\text{Na}_x\text{Fe}_x\text{Ti}_{2-x}\text{O}_4$ ($x = 1, 0.9$ & 0.8) anode materials by tuning sodium deficiency", *Journal of Power Sources* (I.F. = **6.395**), Vol. 366, pp 115-122 (2017).
 3. Deu Soudagar Bhang, Ghulam Ali, Dong-Hyun Kim, Daniel A Anang, Tae Joo Shin, Min Gyu Kim, Yong-Mook Kang, Kyung Yoon Chung* and **Kyung-Wan Nam***, "Honeycomb-layer structured $\text{Na}_3\text{Ni}_2\text{BiO}_6$ as a high voltage and long life cathode material for sodium-ion batteries", *Journal of Materials Chemistry A* (I.F. = **8.867**), Vol. 5, Iss. 3 pp 1300-1310 (2017).
 4. Enyuan Hu, Seong-Min Bak, Yijin Liu, Jue Liu, Xiqian Yu, Yong-Ning Zhou, Jigang Zhou, Peter Khalifah, Kingo Ariyoshi*, **Kyung-Wan Nam***, Xiao-Qing Yang*, "Utilizing Environmental Friendly Fe with Unique Electronic Structure as Substitution Element in Spinel Structured Cathode Material for Safer High Energy Lithium-ion Batteries", *Advanced Energy Materials* (I.F. = **16.721**), Vol. 6, Iss. 3, DOI: 10.1002/aenm.201501662 (2016).
 5. Ya You, Xi-Qian Yu, Ya-Xia Yin, **Kyung-Wan Nam***, and Yu-Guo Guo*, "Sodium iron hexacyanoferrate with high Na content as a Na-rich cathode material for Na-ion batteries", *Nano Research* (I.F. = **7.354**), Vol. 8, Iss. 1, pp 117-128 (2015).
 6. Yong-Ning Zhou, Mahsa Sina, Nathalie Pereira, Xiqian Yu, Glenn G. Amatucci, Xiao-Qing Yang,* Frederic Cosandey,* and **Kyung-Wan Nam***, " $\text{FeO}_{0.7}\text{F}_{1.3}/\text{C}$ nanocomposite as a high capacity cathode material for sodium-ion batteries", *Advanced Functional Materials (Inside Back Cover Article)* (I.F. = **12.124**), Vol. 25, Iss. 5, pp 696-703 (2015).
 7. Seong-Min Bak, Enyuan Hu, Yongning Zhou, Xiqian Yu, Sanjaya Senanayake, Sung-Jin Cho*, Kwang-Bum Kim, Kyung-Yoon Chung, Xiao-Qing Yang*, **Kyung-Wan Nam***, "Structural changes and thermal stability of charged $\text{LiNi}_x\text{Mn}_y\text{Co}_z\text{O}_2$ cathode materials studied by combined in situ time-resolved XRD and mass spectroscopy", *ACS Applied Materials and Interface* (I.F. = **7.504**), Vol. 6, Iss. 24, pp 22594-22601 (2014).
 8. Xiqian Yu, Yingchun Lyu, Lin Gu, Huiming Wu, Seong-Min Bak, Yongning Zhou, Khalil Amine, Steven N. Ehrlich, Hong Li*, **Kyung-Wan Nam***, Xiao-Qing Yang*, "Understanding the rate capability of the high energy density Li-rich layered $\text{Li}_{1.2}\text{Ni}_{0.15}\text{Co}_{0.1}\text{Mn}_{0.55}\text{O}_2$ cathode material", *Advanced Energy Materials* (I.F. = **16.721**), Vol. 4, Iss. 5, pp 1300950 (2014).
 9. Seong-Min Bak, **Kyung-Wan Nam***, Won-Young Chang, Xiqian Yu, Enyuan Hu, Soo-Yeon Hwang, Eric A. Stach, Kwang Bum Kim, Kyung Yoon Chung* and Xiao Qing Yang*, "Correlating Structural Changes and Gas Evolution during the Thermal Decomposition of Charged $\text{Li}_x\text{Ni}_{0.8}\text{Co}_{0.15}\text{Al}_{0.05}\text{O}_2$ Cathode Materials", *Chemistry of Materials* (I.F. = **9.466**), Vol. 25 (3), pp. 337–351, (2013).
 10. **Kyung-Wan Nam**, Seong-Min Bak, Enyuan Hu, Xiqian Yu, Youngning Zhou, Xiaojian Wang, Lijun Wu*, Yimei Zhu, and Xiao-Qing Yang*, "Combining in situ Synchrotron X-ray Diffraction and Absorption Techniques with Transmission Electron Microscopy to Study the Origin of Thermal Instability in Overcharged Cathode Materials for Lithium-Ion Batteries", *Advanced Functional Materials (Frontispiece article)* (I.F. = **12.124**), Vol. 23 (8), pp 1047–1063, (2013).

