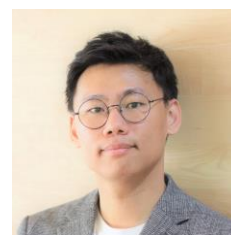


# Curriculum Vitae



**Ju-Hyuck Lee, Ph.D.**

**이주혁 (李柱赫)**

## Assistant Professor

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Research Gate: [https://www.researchgate.net/profile/Ju\\_Hyuck\\_Lee](https://www.researchgate.net/profile/Ju_Hyuck_Lee)

Google scholar: <https://scholar.google.co.kr/citations?user=DtrfaJMAAAAJ&hl=ko>

## PROFESIONAL EXPERIENCE:

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Aug.2018 – Present

### Assistant Professor

Department of Energy Science and Engineering, Daegu Gyeongbuk Institute of Science & Technology (DGIST), Korea

Mar.2016 – Jun. 2018

### Post doctor Fellow

Department of Bioengineering, University of California at Berkeley, Berkeley, USA  
Biological Systems and Engineering, Lawrence Berkeley National Laboratory, Berkeley, USA  
(PI: Prof. Seung-Wuk Lee)

## EDUCATION:

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<b>Master/Ph.D</b>	SKKU Advanced Institute of Nano Technology	Sungkyunkwan University (Korea)	Mar. 2011 ~ Feb.2016
<b>Bachelor</b>	Advanced Materials Science and Engineering	Sungkyunkwan University (Korea)	Mar. 2004 ~ Feb.2011

## EXPERTISE:

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- Synthesis of 3D nano structures (NW, NP, NR, NS) based on ZnO, PVDF, ZnSnO<sub>3</sub>
- Development of complex structure of biomaterials using self-assembly behavior
- Investigate & characterization of piezoelectricity in biopiezoelectric materials
- Design, fabrication & characterization of energy harvester (piezoelectric, triboelectric, pyroelectric)
- Design, fabrication & characterization of hybridizing energy harvesting and storage device
- Micro and nano electrical, mechanical, electromechanical and electrochemical characterization

## **PUBLICATIONS: (SCI(E) Journal)**

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35. D. Kim, S. A. Han, J. H. Kim, **J.-H. Lee\***, S.-W. Kim\*, S.-W. Lee\* "BioMolecular Piezoelectric Materials: From Amino Acids to Living Tissues" *Advanced Materials*, In press  
**[Impact Factor: 25.809]**
34. Y. Lee, S. Kim, D. Kim, C. Lee, H. Park, **J.-H. Lee\*** "Direct-current flexible piezoelectric nanogenerators based on two-dimensional ZnO nanosheet" *Applied Surface Science*, 509, 145328 (2020)  
**[Impact Factor: 5.155]**
33. R. Sugimoto, J. H. Lee, **J.-H. Lee**, H.-E. Jin, S. Y. Yoo\*, S.-W. Lee\*, "Bacteriophage nanofiber fabrication using near field electrospraying" *RSC Advances*, In press  
**[Impact Factor: 3.049]**
32. S. A. Han#, **J.-H. Lee#**, W. Seung, J. Lee, S.-W. Kim\*, J. H. Kim\*, "Patchable and Implantable 2D Nanogenerator" *Small*, <https://doi.org/10.1002/sml.201903519>  
**[Impact Factor: 10.856]**
31. **J.-H. Lee#**, J. H. Lee#, J. Xiao, M. S. Desai, X. Zhang, S.-W. Lee, "Vertical Self-assembly of Polarized Phage Nanostructure for Energy Harvesting" *Nano Letters*, 19, 2661 (2019)  
**[Impact Factor: 12.080]**
30. **J.-H. Lee\***, "Hybridization of the Energy Generator and Storage Device for Self-Powered Electronics" *Journal of the Korean Electrochemical Society*, 21, 68 (2018)
29. **J.-H. Lee**, K. Heo, K. Schulz-Schonhagen, J. H. Lee, M. S. Desai, H.-E. Jin, S.-W. Lee\*, "Diphenylalanine Peptide Nanotube Energy Harvesters" *ACS Nano*, 12, 8138 (2018)  
**[Impact Factor: 13.942]**
28. S. A. Han, T.-H. Kim, S. K. Kim, K. H. Lee, H.-J. Park, **J.-H. Lee**, S.-W. Kim\*, "Point-Defect-Passivated MoS<sub>2</sub> Nanosheet-Based High Performance Piezoelectric Nanogenerator", *Advanced Materials*, 30, 1800342 (2018)  
(*Selected as a cover article*)  
**[Impact Factor: 19.791]**
26. **J.-H. Lee**, J. Y. Park, E. B. Cho, T. Y. Kim, S. A. Han, T.-H. Kim, Y. Liu, S. K. Kim, C. J. Roh, H.-J. Yoon, H. Ryu, W. Seung, J. S. Lee, J. Lee\*, S.-W. Kim\* "Reliable Piezoelectricity in Bilayer WSe<sub>2</sub> for Piezoelectric Nanogenerators" *Advanced Materials*, 4, 1606667 (2017)  
**[Impact Factor: 19.791]**
25. H. Ryu#, **J.-H. Lee#**, T.-Y. Kim, U. Khan, J. H. Lee, S. S. Kwak, H.-J. Yoon, S.-W. Kim\* "High Performance Triboelectric Nanogenerators Based on Solid Polymer Electrolytes with Asymmetric Pairing of Ions" *Advanced Energy Materials*, 7, 1700289 (2017)  
**[Impact Factor: 16.721]** ) #co-first author
24. J. Kim#, **J.-H. Lee#**, J.-W. Lee, Y. Yamauchi, C. H. Choi, J. H. Kim\* "Hybrid Energy Devices Combining Nanogenerators and Energy Storage Systems for Self-Charging Capability" *APL Materials*, 5, 073804 (2017)  
**[Impact Factor: 4.335]** ) #co-first author
23. J. H. Kim, J. H. Lee, H. Ryu, **J.-H. Lee**, S. S. Kwak, S.-W. Kim\* "High-Performance Piezoelectric, Pyroelectric, and Triboelectric Nanogenerators Based on P(VDF-TrFE) with Controlled Crystallinity and Dipole Alignment" *Advanced Functional Materials*, 27, 1700702 (2017) (*Selected as a cover article*)  
**[Impact Factor: 12.124]**

22. W. Seung, H.-J. Yoon, T. Y. Kim, H. Ryu, J. Kim, **J.-H. Lee**, J. H. Lee, S. Kim, Y. K. Park, Y. J. Park, S.-W. Kim\* “Boosting Power-Generating Performance of Triboelectric Nanogenerators via Artificial Control of Ferroelectric Polarization and Dielectric Properties” *Advanced Energy Materials*, 7, 1600988 (2017) (*Selected as a cover article*)  
**[Impact Factor: 16.721]**
21. **J.-H. Lee**, J. Kim, T. Y. Kim, M. D. A Hossain, S.-W. Kim\*, J. H. Kim\* “All-in-one energy harvesting and storage devices”, *Journal of Materials Chemistry A*, 4, 7983 (2016)  
**[Impact Factor: 8.867]**
20. K. Y. Lee, S. K. Kim, **J.-H. Lee**, D. Seol, M. K. Gupta, Y. Kim\*, S.-W. Kim\* “Controllable Charge Transfer by Ferroelectric Polarization Mediated Triboelectricity”, *Advanced Functional Materials*, 26, 3067 (2016)  
**[Impact Factor: 12.124]**
19. U. Khan, T.-H. Kim, K. H. Lee, **J.-H. Lee**, H. J. Yoon, R. Bhatia, I. Sameera, W. Seung, H. J. Ryu, C. Falconi\*, S.-W. Kim\* “Self-powered, wearable, transparent and flexible graphene microheaters”, *Nanoenergy*, 17, 356 (2015)  
**[Impact Factor: 12.343]**
18. **J.-H. Lee**, R. Hinchet, T. Y. Kim, H. Ryu, W. Seung, H.-J. Yoon, S.-W. Kim\* “Control of Skin Potential by Triboelectrification with Ferroelectric Polymers”, *Advanced Materials*, 27, 5553 (2015)  
**[Impact Factor: 19.791]**
17. B.-Y. Hwang<sup>#</sup>, **J.-H. Lee**<sup>#</sup>, T. Q. Trung<sup>#</sup>, E. Roh, D.-I. Kim, S.-W. Kim\*, N.-E. Lee\* “Transparent Stretchable Self-Powered Patchable Sensor Platform with Ultrasensitive Recognition of Human Activities”, *ACS Nano* 9, 8801 (2015)  
<sup>#co-first author</sup>  
**[Impact Factor: 13.942]**
16. **J.-H. Lee**, H. Ryu, T.-Y. Kim, S.-S. Kwak, H.-J. Yoon, T.-H. Kim, W. Seung, S.-W. Kim\* “Thermally Induced Strain-Coupled Highly Stretchable and Sensitive Pyroelectric Nanogenerators”, *Advanced Energy Materials* 5, 1500704 (2015) (*Selected as a cover article*)  
**[Impact Factor: 16.721]**
15. **J.-H. Lee**, H.-J. Yoon, T. Y. Kim, M. K. Gupta, J. H. Lee, W. Seung, H. Ryu, S.-W. Kim\* “Micro-patterned P(VDF-TrFE) films-based piezoelectric nanogenerators for highly sensitive self-powered pressure sensors”, *Advanced Functional Materials* 25, 3203 (2015) (*Selected as a cover article*)  
**[Impact Factor: 12.124]**
14. W. Seung, M. K. Gupta, K. Y. Lee, K.-S. Shin, **J.-H. Lee**, T. Y. Kim, S. Kim, J. Lin, J. H. Kim, S.-W. Kim\* “Nanopatterned Textile-Based Wearable Triboelectric Nanogenerator”, *ACS Nano* 9, 3501 (2015)  
**[Impact Factor: 13.942]**
13. G. C. Yoon, K.-S. Shin, M. K. Gupta, K. Y. Lee, **J.-H. Lee**, Z. L. Wang, S.-W. Kim\* “High-performance Hybrid cell based on an organic photovoltaic device and a direct current piezoelectric nanogenerator”, *Nano Energy* 12, 547 (2015)  
**[Impact Factor: 12.343]**
12. K.Y. Lee, J. Bae, S. Kim, **J.-H. Lee**, G.C. Yoon, M.K. Gupta, S. Kim, H. Kim, J. Park\*, and S.-W. Kim\* “Depletion width engineering via surface modification for high performance semiconducting piezoelectric nanogenerators”, *Nano Energy* 8, 165 (2014)  
**[Impact Factor: 12.343]**
11. K. Y. Lee, J. Chun, **J.-H. Lee**, K. N. Kim, N.-R. Kang, J.-Y. Kim, M. H. Kim, K.-S. Shin, M. K. Gupta, J. M. Baik\* and S.-W. Kim\* “Hydrophobic Sponge Structure-Based Triboelectric Nanogenerator”, *Advanced Materials* 29, 5037 (2014) (*Selected as a cover article*)  
**[Impact Factor: 19.791]**

10. **J.-H. Lee**, K. Y. Lee, M. K. Gupta, T. Y. Kim, D.-Y. Lee, J. Oh, C. Ryu, W. J. Yoo, C.-Y. Kang, S.-J. Yoon, J.-B. Yoo, and S.-W. Kim\* “Highly Stretchable Piezoelectric-Pyroelectric Hybrid Nanogenerator”, *Advanced Materials* **26**, 765 (2014) (*Selected as a cover article*)  
[Impact Factor: 19.791]
9. K. Y. Lee, D. K, **J.-H. Lee**, T. Y. Kim, M. K. Gupta, and S.-W. Kim\* “Unidirectional High-Power Generation via Stress-Induced Dipole Alignment from ZnSnO<sub>3</sub> Nanocubes/Polymer Hybrid Piezoelectric nanogenerator”, *Advanced Functional Materials* **24**, 37 (2014) (*Selected as a cover article*)  
[Impact Factor: 12.124]
8. M. K. Gupta, **J.-H. Lee**, K. Y. Lee, S.-W. Kim\* “Two-Dimensional Vanadium-Doped ZnO Nanosheet-Based Flexible Direct Current Nanogenerator”, *ACS Nano* **7**, 8932 (2013)  
[Impact Factor: 13.942]
7. V. T. Le, H. Kim, A. Ghosh, J. Kim, J. Chang, Q. A. Vu, D. T. Pham, **J.-H. Lee**, S.-W. Kim and Y. H. Lee\* “Coaxial Fiber Supercapacitor Using All-Carbon Material Electrodes”, *ACS Nano* **7**, 5940 (2013)  
[Impact Factor: 13.942]
6. K.-H. Kim, B. Kumar, K.Y. Lee, H.-K. Park, **J.-H. Lee**, H. H. Lee, H. Jun, D. Lee & S.-W. Kim\* “Piezoelectric two-dimensional nanosheets/anionic layer heterojunction for efficient direct current power generation”, *Scientific Reports* **3** (2013)  
[Impact Factor: 4.259]
5. S. Kim, **J.-H. Lee**, J. Lee, S.-W. Kim, M .H. Kim, S. Park, H. Chung, Y.-I. Kim, and W. Kim\* “Synthesis of Monoclinic Potassium Niobate Nanowires That Are Stable at Room Temperature”, *Journal of the American Chemical Society* **135**, 6 (2013)  
[Impact Factor: 13.858]
4. T. T. Pham, K. Y. Lee, **J.-H. Lee**, K. H. Kim, K. S. Shin, M. K. Gupta, B. Kumar, and S.-W. Kim\* “Reliable operation of nanogenerator under ultraviolet light via engineering piezoelectric potential”, *Energy & Environmental Science* **6**, 841 (2013)  
[Impact Factor: 29.518]
3. **J.-H. Lee**, K. Y. Lee, B. Kumar, N. T. Tien, N.-E. Lee, and S.-W. Kim\* “Highly Sensitive Stretchable Transparent Piezoelectric Nanogenerators”, *Energy & Environmental Science* **6**, 169 (2013)  
[Impact Factor: 29.518]
2. S. Y. Chung, S. Kim, **J.-H. Lee**, K. Kim, S.-W. Kim\*, C.-Y. Kang and Y. S. Kim\* “All-Solution-Processed Flexible Thin Film Piezoelectric Nanogenerator”, *Advanced Materials* **24**, 6022 (2012) (*Selected as a cover article*)  
[Impact Factor: 19.791]
1. **J.-H. Lee**, K.Y. Lee, B. Kumar, S.-W. Kim\*, “Synthesis of Ga-Doped ZnO Nanorods Using an Aqueous Solution Method for a Piezoelectric Nanogenerator” *Journal of Nanoscience and Nanotechnology* **12**, 3430 (2012)  
[Impact Factor: 1.483]

## NON SCI(E) PUBLICATIONS

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1. **J.-H. Lee\***, “Hybridization of Energy Generator and Storage Device for Self-Powered Electronics” *Journal of the Korean Electrochemical Society*, **21**, 68 (2018)
2. **J.-H. Lee**, S.-W. Kim\*, “Recent Advances in Piezoelectric Nanogenerators for Self-Powered Smart Sensors” *Journal of photonic Science and Technology*, **1**, 36 (2011)

## **PATENTED TECHNOLOGY TRANSFER**

1. ELECTROSTATIC ENERGY HARVESTER COUPLED WITH FERROELECTRIC EFFECT Registration No. 10-1398708 (KOREA), **Samsung Electronics Co., Ltd. (300,000,000 KRW)**

## **PATENT (US):**

6. Hybrid power generating device, Sang Woo Kim, Keun Young Lee, **Ju-Hyuck Lee**, Suhyun Yoon, Registration No. 10,236,794 (US)
5. Triboelectric energy generator using control of dipole polarization direction and method of fabricating thereof, Sang Woo Kim, Wan Chul Seung, **Ju-Hyuck Lee**, Sang Hyun Kim, Hong Joon Yoon, Registration No. 10,050,562 (US)
4. Electrostatic energy generator using tire cord fabric, Sang Woo Kim, Wanchul Seung, **Ju-Hyuck Lee**, Keun Young Lee, Sung Soo Kwak, Tae Yun Kim, Registration No. 10,000,097 (US)
3. Fibrous triboelectric generator and electronic stimulator using the fibrous triboelectric generator and clothes using the electronic stimulator, Sang-Woo Kim, **Ju-Hyuck Lee**, Wanchul Seung, Hanjun Ryu, Hong-Joon Yoon, Keun Young Lee, Registration No. 9,837,934 (US)
2. Method of manufacturing zinc oxide nanosheet structure, and electronic apparatus and touch sensor apparatus having the zinc oxide nanosheet structure, Sang-Woo Kim, **Ju-Hyuck Lee**, Keun Young Lee, Registration No. 9,746,955 (US)
1. Nanogenerator comprising boron nitride atomic layer, Sang Woo Kim, **Ju Hyuck Lee**, Kang Hyuck Lee, Keun Young Lee, Jin Yeong Lee, Wal Chul Seung, Registration No. 9,406,864 (US)

## **PATENT (KOREA):**

29. 회전축의 회전에너지를 이용한 전기발생장치, 김상우, 승완철, 이근영, **이주혁**, 한상아, 김성수, 유한준, 등록번호:10-1685789
28. 파도를 이용한 마찰전기 발생장치, 김상우, 이정환, 곽성수, 유한준, **이주혁**, 승완철, 박혜정, 김지혜, 등록번호:10-1880799
27. 정전기 및 마찰 전기 현상을 이용한 마스크, 김상우, 윤홍준, **이주혁**, 승완철, 한상아, 박혜정, 김성균, 김성수, 곽성수, 김태호, 유한준, 김한, 등록번호:10-1815757
26. 고유전 물질을 이용한 정전기 에너지 발전소자, 김상우, 이정환, 김지혜, 유한준, 승완철, **이주혁**, 박혜정, 곽성수, 등록번호:10-1803634
25. 강유전 물질을 이용한 아토피 치료용 패드 및 강유전 물질을 이용한 아토피 치료용 의복, 김상우, 김태윤, 박혜정, 승완철, 유한준, 윤홍준, 이정환, **이주혁**, 등록번호:10-1645137
24. 레크 및 피니언기어를 이용한 전기 발생 소자, 김상우, **이주혁**, 김태윤, 승완철, 유한준, 윤홍준, 이정환, 등록번호:10-1719069
23. 초음파를 이용한 전기 에너지 발생시스템, 김상우, 김성수, 승완철, 윤홍준, **이주혁**, 크리스티 안팔코니, 우스만 칸, 등록번호:10-1611136
22. 하이브리드 형태의 전해질을 이용한 마찰전기 에너지 발전소자, 김상우, 김지혜, 김한, 유한준, **이주혁**, 이정환, 곽성수, 윤홍준, 김성수, 김태윤, 김상현, 등록번호:10-1694003
21. 형상기억 폴리머 지지체를 이용한 정전기 에너지 발전소자, 김상우, 곽성수, 승완철, 유한준, 윤홍준, 이정환, **이주혁**, 등록번호:10-1645134
20. 다상 마찰전기 에너지 발전소자, 김상우, 곽성수, 김성균, 김성수, 승완철, 유한준, 윤홍준, 이

정환, 이주혁, 등록번호:10-1705974

19. 전해질을 이용한 마찰전기 발생소자, 김상우, 곽성수, 김성수, 김태윤, 승완철, 유한준, 윤홍준, 이정환, 이주혁, 등록번호:10-1611126
18. 산화아연 나노시트 구조물 제조방법 및 이에 의해 제조된 산화아연 나노시트 구조물을 포함하는 전자장치와 터치센서장치, 김상우, 이근영, 이주혁, 등록번호:10-1573652
17. 회전운동을 이용한 마찰전기 에너지 발생장치, 김상우, 이주혁, 승완철, 윤홍준, 유한준, 등록번호:10-1569311
16. 온도변화에 의해 에너지를 발생시키는 에너지 발생소자 및 이를 포함하는 온도변화감지센서, 김상우, 곽성수, 김태윤, 김태호, 승완철, 유한준, 윤홍준, 이주혁, 등록번호:10-1578321
15. 강유전체를 이용한 2차원 구조 물질의 p-n 접합 형성 방법 및 강유전체를 이용하여 p-n 접합된 2차원구조물질, 김상우, 이강혁, 유한준, 이주혁, 김태호, 등록번호:10-1537492
14. 마찰물질 및 강유전 물질이 커플링된 마찰전기 에너지 발전 소자, 김상우, 이주혁, 이근영, 승완철, 유한준, 윤홍준, 등록번호:10-1532889
13. 쌍극자 분극 방향 제어를 이용한 에너지 발전기 및 이의 제조 방법, 김상우, 승완철, 이주혁, 이근영, 김상현, 윤홍준, 등록번호:10-1532887
12. 타이어 코드지용 섬유를 이용한 정전기 에너지 발생장치, 김상우, 승완철, 이주혁, 이근영, 곽성수, 김태윤 등록번호:10-1557245
11. 섬유형 마찰전기 발전 소자, 마찰전기를 이용한 전기자극기 및 이를 이용한 마찰전기 발전 의류, 김상우, 이주혁, 승완철, 유한준, 윤홍준, 이근영, 등록번호:10-1552445
10. 하이브리드 발전소자, 이근영, 이주혁, 김상우, 윤수현, 등록번호:10-1529814
9. 신축성을 갖는 에너지 발전 소자 및 이의 제작 방법, 김상우, 이주혁, 이근영, 김성수, 김태윤, 등록번호:10-1465366
8. 강유전 특성이 커플링된 정전기 에너지 발전 소자, 김상우, 김상우, 이근영, 김성수, 이주혁, 등록번호:10-1398708
7. 압전물질 및 중합체가 혼합된 복합체를 포함한 압전 에너지 발전소자, 김상우, 이근영, 김도환, 이주혁, 등록번호:10-1465346
6. 그래핀을 이용한 미소에너지 나노전력발전소자, 김상우, 이근영, 서주석, 김권호, 이주혁, 등록번호:10-1261726
5. LDH 층을 포함한 직류 전압형 압전 에너지 발전 소자 및 이와 결합된 태양전지, 김상우, 윤규철, 이근영, 신경식, 이주혁, 등록번호:10-1420053
4. 텍스타일 전극을 이용한 압전 전력 발전 소자, 김상우, 이주혁, 김성수, 등록번호: 10-1401164
3. 패시베이션 효과를 이용한 고출력 나노전력발전소자, 김상우, 이근영, 이주혁, 김권호, 승완철, 등록번호:10-1261186
2. 2차원 산화아연 나노시트 기반 나노전력발전소자의 제조 방법 및 그 방법으로 제조된 발전 소자, 김상우, 김권호, 이주혁, 이근영, 승완철, 등록번호:10-1360839
1. 나노전력발전소자 및 이의 제조방법, 김상우, 이주혁, 이강혁, 이근영, 이진영, 승완철, 등록번호:10-1259729

## **AWARDS and HONORS:**

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1. International Postdoctoral Fellowship Program, NRF, Sep 2016-Aug 2017
2. International Postdoctoral Fellowship Program, SKKU, Mar 2016-Aug 2016
3. Samsung Humantech Paper Bronze Award, Samsung Humantech, Korea, Feb 2016
4. Outstanding graduate student award, SKKU Advanced Institute of Nanotechnology (SAINT), Sungkyunkwan University, Korea, Feb 2016
5. Outstanding Master/Ph.D Student Grand Award, BK21 program, School of Advanced Materials of Science and Engineering, Sungkyunkwan University, Korea, Dec 2012
6. Outstanding Master/Ph.D Student Bronze Award, BK21 program, School of Advanced Materials of Science and Engineering, Sungkyunkwan University, Korea, Feb 2012
7. Best Poster Award “P(VDF-TrFE) based Stretchable Piezoelectric-Pyroelectric Nanogenerator” The 1<sup>st</sup> International Conference on Nanoenergy and Nanosystems, China, Dec 2014
8. Best Poster Award “Stretchable Piezoelectric-Pyroelectric Hybrid Energy Harvester Based on P(VDF-TrFE)” The 21<sup>st</sup> Korean Conference on Semiconductors, Korea, Feb 2014
9. Best Poster Award “Highly Stretchable Micro-patterned pizeo-pyroelectric Hybrid Nanogenerator” The 2<sup>nd</sup> International Conference on Advanced Electromaterials, Korea, Dec 2013
10. Best Poster Award “Free-Standing Power Generators Sandwiched with Modified Graphene Electrodes”, The Korean Institute of Metal and Materials, Korea, Apr 2012