

# Curriculum Vitae

**Jeong Won Kim**

---

**Address:** Department of Nano-structured Materials,  
National Nanofab Center,  
291 Daehak-ro, Yuseong-gu, Daejeon 305-338, Republic of Korea

**Mobile:** +82-10-6687-3821

**Tel:** +82-42-366-1786

**Fax:** +82-42-366-1990

**E-mail:** [pleiadesjwkim@gmail.com](mailto:pleiadesjwkim@gmail.com)

**Web:** <http://www.nnfc.re.kr>



---

## **Personal information**

- Date of Birth: Aug. 24, 1980, Republic of Korea
- Gender: Male
- Marital Status: Married

## **Education**

**Ph. D.** (Sept. 2009 – Feb. 2015)

School of Materials Science and Engineering, Gwangju Institute of Science and Technology(GIST),  
Korea *Advisor: Won Bae Kim*

(*Thesis title:* Synthesis and Characterization of Inorganic Nanomaterials via Chemical Solution Routes  
and Their Photovoltaic Properties)

**M. S.** (Sept. 2007 – Aug. 2009)

School of Materials Science and Engineering, Gwangju Institute of Science and Technology(GIST),  
Korea *Advisor: Won Bae Kim*

(*Thesis title:* Preparation of Nanostructure CdSe Materials for Photoelectric Properties)

**B. S.** (Mar. 1999 – Aug. 2007)

Dept. of Physics, Kyungpook National University, Daegu, Korea  
Military service (mandatory in Korea) (2000-2002)

## **Honors and Awards**

- Scholarship supported by Kyungbook National University, 2003. 09 ~ 2006. 09
- Scholarship supported by Korean government, 2007. 09 ~ 2014. 3
- Scholarship supported by BK (Brain Korea) 21 project, 2007. 09 ~ 2013. 02

## **Experience**

### **National Nanofab Center**

- Department of Nano-Structured Materials (2015. 02. 01 ~ )

## **Research Interests**

### **1. Developments of high performance electrode materials for battery and supercapacitor**

- 1) Design of nanostructured materials for improved kinetics and reversibility (e.g., aligning 1D, layered 2D, and 3D channel)
- 2) Chemical and physical syntheses of novel active nanomaterials with high surface area for energy density, low cost and long life time (e.g.,  $\text{Co}_3\text{O}_4$ ,  $\text{CuO}$ ,  $\text{Fe}_2\text{O}_3$ ,  $\text{Mn}_3\text{O}_4$ ,  $\text{SnO}_2$ , and etc)

### **2. Design and fabrication of novel nanostructures for highly efficient photovoltaic devices**

(photo-electrochemical cells, organic solar cells, and dye-sensitized solar cell)

- 1) Synthesis of inorganic 1D & 3D hierarchical nanomaterials for highly active photo-anodes (e.g., Cd-chalcogenides having low band-gap)
- 2) Developments of inorganic photo-electrode with novel nanostructures for high mobility, large area, and enhanced charge separation (e.g.,  $\text{Cd}(\text{OH})_2$ ,  $\text{WO}_3$ ,  $\text{ZnO}$ ,  $\text{TiO}_2$ ,  $\text{SrTiO}_3$ ,  $\text{ZnS}$ , etc)
- 3) Development of efficient photo-electrochemical electrode for generation of chemical fuels, such as hydrogen or oxygen, *via* water splitting,  $2\text{H}_2\text{O} + \text{light} \rightarrow 2\text{H}_2 + \text{O}_2$ .
- 4) Band-gap engineering to improve the solar absorption via doping and surface modification

### **3. Hybrid systems between battery, supercapacitor, solar cell and fuel cell for versatile power sources**

## **Technical skills**

### **1. Fabrication and characterization of energy conversion**

- Fabrication and analysis of inorganic/organic hybrid solar cells.

### **2. Synthesis and characterization of 1D and 3D hierarchical nanostructured materials**

- Synthesis and characterization of 1D and hierarchical nanostructures (nanorods, nanowires and nanotubes) of inorganic, metallic and composited materials using electrospinning, hydrothermal synthesis, chemical precipitation, chemical conversion from template materials.

### **3. Characterizing tools for analyzing the synthesized materials**

- FETEM, FESEM, XRD, AFM, XPS, X-ray absorption fine structures (XAFS).
- FT-IR, UV-visible spectroscopy, PL, EL.

- Potentiostat/Galvanostat, AC impedance spectroscopy, scanning electrochemical microscopy (SECM).
- Solar simulator, IPCE, IQE, in-situ optical measurement using monochromatic laser beam.
- Design and fabrication of vacuum equipment such as RF-magnetron sputter, e-beam and thermal evaporator with ultrahigh vacuum (less than  $10^{-7}$  torr).

## **Recent Research Area**

### **1. Research and application of aligned nano-patterning technique**

(e.g., AAO template, nano-imprinting method and secondary sputtering lithography)

- 1) Synthesis and characterization of AAO (anodized aluminum oxide) having various diameter and shape (V-type, U-type and etc.)
- 2) Arrayed pattern of various nanostructures (nano-dot, nanorod and 3-dimensional structure) via nano-imprinting method using PDMS, AAO or ion milling.
- 3) New approach for fabrication ultrahigh resolution (ca.  $< 20$  nm) patterns of various shapes and high aspect ratios (ca. 15) over large area via secondary sputtering lithography.
- 4) Application:
  - (a) Electrode (cathode and anode) having various nano-pattern array in secondary battery, and polymer solar cell
  - (b) Membrane by nanopore having various diameters
  - (c) Surface treatment via electrochemical reaction such as electrodeposition and corrosion

### **2. Research and application of 3D anode using MXene in energy storage device**

- 1) Synthesis and characterization of MXene.
- 2) Fabrication of blended electrode (MXene and other nano-materials) for higher capacity of anode in energy storage device

## **Teaching Experience**

- Solid State Electrochemistry for graduated student (Sept. 2012 – Feb. 2013)  
Teaching Assistant in School of Materials Science and Engineering, GIST
- Principles of Solid Catalysis for graduated student (Mar. 2013 – June 2013)  
Teaching Assistant in School of Materials Science and Engineering, GIST

## **List of Publications**

1. **J. W. Kim**, J. G. Lee, and W. B. Kim, "Fabrication of vertical TiO<sub>2</sub>/Sb<sub>2</sub>S<sub>3</sub> Core/Shell heterostructures via chemical bath deposition for application upon the photo-generation of electricity" (2017) in submitted.
2. **J. W. Kim**, H.-J. Jeon, C.-L. Lee, and Chi Won Ahn, "Fabrication of three-dimensional hybrid nanostructure-embedded ITO and its application as a transparent electrode for high-efficiency solution processable organic photovoltaic devices", *Nanoscale*, (2017) DOI: 10.1039/c6nr06552j.
3. **J. W. Kim**, Y.-H. Suh, C.-L. Lee, Y. S. Kim, and Won Bae Kim, "Nano-grid structure made of perovskite SrTiO<sub>3</sub> nanowires for efficient electron transport layers in inverted polymer solar cells", *Nanoscale*, (2015) 7:4367-4371. (*Highlighted in the Renewable Energy Global Innovations*)
4. **J. W. Kim**, H.-S. Shim, S. W. Ko, U. Jeong, C.-L. Lee, and W. B. Kim, "Thorny CdSe Nanotubes via an Aqueous Anion Exchange Reaction Process and Their Photoelectrochemical Applications", *Journal of Materials Chemistry*, (2012) 22:20889-20895. (*Highlighted in back cover page in the printed issue of the journal*)
5. **J. W. Kim**, H.-S. Shim, J. G. Lee, and W. B. Kim, "The Facile Synthesis of CdSe Hollow Nanoparticles and Necklace-like Nanowires from a CdO Sacrificial Template via Chemical Reaction in Aqueous Solution", *Journal of Materials Science*, (2014) 49:2912-2918.
6. Y. S. Kim, B. -K. Yu, **J. W. Kim**, Y. -H. Suh, D. -Y. Kim, and W. B. Kim, "Building a hybrid nanocomposite assembly of gold nanowires and thienyl-derivative fullerenes to enhance electron transfer in photovoltaics", *Journal of Materials Chemistry A*, (2013) 1:5015-5020.
7. C. T. Ho, **J. W. Kim**, W. B. Kim, K. Song, R. A. Kanaly, M. J. Sadowsky, and H.-G. Hur, "Shewanella-mediated Synthesis of Selenium Nanowire and Nanoribbons", *Journal of Materials Chemistry*, (2010) 20:5899-5905.
8. S. W. Ko, **J. W. Kim**, G. D. Moon, H.-S. Shim, W. B. Kim and U. Jeong, "Porous Networks of CdSe Nanocrystal Chains from Ultrafine Cd(OH)<sub>2</sub> Nanowires and Their Composite Materials", *Langmuir*, (2009) 26:4377-4381.

9. H.-S. Shim, V. R. Shinde, **J. W. Kim**, T. P. Gujar, O. -S. Joo, H. J. Kim, and W. B. Kim , "Diameter-Tunable CdSe Nanotubes from Facile Solution-Based Selenization of Cd(OH)<sub>2</sub> Nanowire Bundles for Photoelectrochemical Cells“, (2009) *Chemistry of Materials*, 21:1875-1883.
10. H.-S. Shim, **J. W. Kim**, Y. E. Sung, and W. B. Kim, "Electrochromic Properties of Tungsten Oxide Nanowires Fabricated by Electrospinning Method“, (2009) *Solar Energy Materials & Solar Cells* 93:2062-2068.
11. H.-S. Shim, **J. W. Kim**, and W. B. Kim, "Fabrication and optical properties of conjugated polymer composited multi-arrays of TiO<sub>2</sub> nanowires via sequential electrospinning“ *Journal of Nanoscience and Nanotechnology*, (2009) 9:4721-4726.

### **Patent Application**

1. **J. W. Kim**, Y.-H. Suh, and Won Bae Kim, “Nano-grid structure made of perovskite SrTiO<sub>3</sub> nanowires for efficient electron transport layers in inverted polymer solar cells”, **patent application** 10-2015-0030880.

### **Selected List of International Presentations**

1. **J. W. Kim**, H.-J. Jeon, C.-L. Lee, and Chi Won Ahn, “Fabrication of three-dimensional hybrid nanostructure-embedded ITO and its application as a transparent electrode for high-efficiency solution processable organic photovoltaic devices”, 2017 MRS spring meeting, Phoenix, AZ USA, (April 17-21, 2017)
2. **J. W. Kim**, J. G. Kim, Y. Kim, Y. Noh, H. Song, H. J. Kim, and W. B. Kim, "A Study of 1-Dimensional SrTiO<sub>3</sub> Nanostructures for Efficient Electron Transport Layers of Photovoltaic Device", Global Photovoltaic Conference 2013, Busan, Korea, (November 23-26, 2013)
3. **J. W. Kim**, and W. B. Kim, “A Study of 1-Dimensional Nanostructures for Efficient Electron Transport Layers of Photovoltaic Device”, WCCE9 & APCCChE 2013, Seoul, Korea, (August 18-23, 2013)

4. **J. W. Kim**, Y. H. Suh, J. G. Lee, and W. B. Kim, "The Facile Synthesis of CdSe Hollow Nanoparticles and Necklace-like Nanowires from CdO Sacrificial Template via Chemical Reaction in Aqueous Solution Nanotube", ICMAT 2013, Singapore, (June 30-July 5, 2013).
5. **J. W. Kim**, Y. S. Kim, Y.-H. Suh, J. G. Lee, and W. B. Kim, "Thorny CdSe Nanotubes via an Aqueous Anion Exchange Reaction Process and Their Photoelectrochemical Applications", 10th Nano Korea 2012, Seoul, Korea, (August 16-18, 2012).
6. **J. W. Kim**, H.-S. Shim, Y. S. Kim, W. H. Lee, H. S. Jang and W. B. Kim, "Urchin-like CdSe Nanotubes Structures Prepared via Anion Exchange Reaction in Aqueous Solution for Photovoltaic devices", 2010 MRS spring meeting, San Fransisco, CA, USA, (April 5-9, 2010).
7. **J. W. Kim**, H. S. Shim, M. Anand, Y. S. Kim, H. S. Jang, W. H. Lee, and W. B. Kim, "Hybrid solar cells based on the electrospun ZnO nanowires.", Renewable energy 2008, BEXCO, Pusan, Korea (Oct 16, 2008).
8. **J. W. Kim**, H. S. Shim, V. R. Shinde, Y. S. Kim, and W. B. Kim, "Diameter-controlled CdSe nanotubes synthesis from Cd(OH)<sub>2</sub> nanowire bundles via low temperature conversion process.", 2008 Korea-Japan-Taiwan Joint Symposium, Gyeongju, Korea (Sep. 17-20, 2008).