Sangwook Lee

Kyungpook National University
School of Materials Science & Engineering
80 Daehakro, Bukgu, Daegu, 41566, Korea

Phone : +82-53-950-5632
Email : wook2@knu.ac.kr

PROFESSIONAL APPOINTMENTS

- **Assistant Professor** 09/2015 - present
  School of Materials Science & Engineering
  Kyungpook National University
- **Research Associate (Specialist) / Postdoctoral Researcher** 12/2011 - 07/2015
  (Supervisor: Prof. Junqiao Wu)
  Department of Material Science and Engineering
  University of California at Berkeley
- **Senior Researcher** 10/2009 - 11/2011
  Research Institute of Advanced Materials
  Seoul National University, Korea

EDUCATION

- **Ph.D.** (Advisor: Prof. Kug Sun Hong) 03/2003-08/2009
  Department of Materials Science & Engineering,
  Seoul National University, Korea
  Dissertation: "Charge Generation and Transfer Characteristics in Nanostructured Semiconductor for Photo Energy Conversion Systems"
- **B.S.** 03/1999-02/2003
  Department of Materials Science & Engineering
  Seoul National University, Korea

RESEARCH FIELDS

- **Materials Synthesis & Characterization: Functional Nano-scale Semiconductors**

- Correlated electron system (metal to insulator transition): VO_2 nanowire/nanoplate/thin film
- Two-dimensional materials: black phosphorus, and transition metal chalcogenides
- Light harvesting materials: methylammonium lead halides (perovskite), quantum dots (CdS, CdSe, and ZnS), and oxides (titanate, vanadate, stannate, tunstate, and phosphate)
- One-dimensional oxides on transparent conducting substrates for photoenergy conversion
  : TiO_2 nanotubes/nanowires, SnO_2 nanowires, and ZnO nanowires
- Transparent conducting oxides: Nb-doped TiO_2, Sn-doped In_2O_3, F-doped SnO_2, Sb-doped SnO_2, and Al-doped ZnO

- Functionalizing materials by doping or surface modifications

- **Applications: Photo/Thermal Energy Conversion, Transport, and Transfer Systems**

- Thermal transport & thermoelectric approach using a suspended-pads-type microdevice system
- Organic-inorganic hybrid heterojunction perovskite solar cells & sensitized solar cells
- Photoelectrochemical water splitting system
- Micro-actuators for heat/electric/photo energy conversion

SELECTED PAPERS

Total publications: 102, Total citations: 4487, H-index: 37

1. S.Y. Kim, H.C. Lee, Y. Nam, Y. Yun, S.H. Lee, D.H. Kim, J.H. Noh, J.H. Lee, D.H. Kim, Sangwook Lee*, Y.W. Heo*, "Ternary diagrams of the phase, optical bandgap energy and photoluminescence of mixed-halide perovskites", ***Acta Materialia,* 2019,** in press
2. D.G. Lee, M. Kim, B.J. Kim, S.M. Lee, M. Choi, Sangwook Lee*, and H.S.Jung*, "Effect of TiO2 Particle Size and Layer Thickness on Mesoscopic Perovskite Solar Cells", ***Appl. Surf. Sci.*, 2019**, 144, 131
3. S.Y. Kim, Y.Yun, S.Shin, J.H.Lee, Y.W. Heo*, Sangwook Lee*, "Wide Range Tuning of Band Gap Energy of A3B2X9 Perovskite-like Halides", ***Scr. Mater.*, 2019**, 166, 107
4. B. J. Kim, Sangwook Lee*, H. S. Jung*," Recent Progressive Efforts in Perovskite Solar Cells toward Commercialization", ***J. Mater. Chem. A*, 2018**, 6, 12215
5. S.L. Kwon, Y.U. Jin, B.J. Kim, M.H. Han, G.S. Han, S. Shin, Sangwook Lee*, H.S. Jung*, "Infiltration of methylammonium metal halide in highly porous membranes using sol-gel-derived coating method", ***Appl. Surf. Sci.*, 2017**, 416, 96
6. Sangwook Lee", K. Hippalgaonkar", F. Yang", J. Hong", C. Ko, J. Suh, K. Liu, K. Wang, J.J. Urban, X. Zhang, C. Dames, S.A. Hartnoll, O. Delaire*, J. Wu* , "Anomalously low electronic thermal conductivity in metallic vanadium dioxide", ***Science*, 2017**, 355, 371
7. D.S. Kong, M.J. Kim, H.J. Song, I.S. Cho, S. Jeong, H. Shin, Sangwook Lee*, H.S. Jung*, "Fine tuning of emission property of white light-emitting diodes by quantum-dot-coating on YAG:Ce nanophosphors", ***Appl. Surf. Sci.*, 2016**, 379, 467
8. Sangwook Lee", F. Yang", J. Suh, S. Yang, Y. Lee, G. Li, H.S.Choe, A. Suslu, Y.Chen, C. Ko, J.Park, K.Liu, J.Li, K.Hippalgaonkar, J.J. Urban, S. Tongay, J. Wu*, "Anisotropic in-plane thermal conductivity of black phosphorus nanoribbons at temperatures higher than 100K", ***Nat. Commun.*, 2015**, 6, 8573
9. B.J. Kim, D.H. Kim, Y.Y. Lee, H.W. Shin, G.S. Han, J.S. Hong, K. Mahmood, T.K. Ahn, Y.C. Joo, K.S. Hong, N.G. Park, Sangwook Lee*, H.S. Jung*, "Highly Efficient and Bending Durable Perovskite Solar Cells: Toward Wearable Power Source", ***Energy & Environ. Sci.*, 2015**, 8, 916
10. Sangwook Lee, C Cheng, H Guo, K Hippalgaonkar, K Wang, J Suh, K Liu, J Wu*, "Axially Engineered Metal-Insulator Phase Transition by Graded Doping VO2 Nanowires", ***J. Am. Chem. Soc.*, 2013**, 135, 4850

11. Sangwook Lee, IJ Park, DH Kim, WM Seong, DW Kim, GS Han, JY Kim, HS Jung*, KS Hong*, "Crystallographically Preferred Oriented TiO2 Nanotube Arrays for Efficient Photovoltaic Energy Conversion", ***Energy & Environ. Sci.*, 2012**, 5, 7989
12. SH Han", Sangwook Lee", H Shin, HS Jung*, "A Quasi-Inverse Opal Layer Based on Highly Crystalline TiO2 Nanoparticles: A New Light-Scattering Layer in Dye-Sensitized Solar Cells", ***Adv. Energy Mater.*, 2011**, 1, 546
13. Sangwook Lee, IS Cho, JH Lee, DH Kim, DW Kim, JY Kim, H Shin, JK Lee*, HS Jung*, NG Park, K Kim, MJ Ko, KS Hong*, "Two-Step Sol-Gel Method-Based TiO2 Nanoparticles with Uniform Morphology and Size for Efficient Photo-Energy Conversion Devices", ***Chem. Mater.*, 2010**, 22, 1958

SELECTED PATENTS

Pending (International: 1, Domestic: 4)

1. The channel of the electronic device that controls the heat movement and the electronic device that controls the heat movement, PCT/KR2018/010344, 2018.09.05, PCT

Registered (US: 2, Domestic: 20)

1. Titanium oxide nano tube material and method for manufacturing the same, **US 8613901**, 2013.12.24, USA
2. Visible light-responsive photocatalyst composition containing tungsten-based oxides and method of producing the same, **US 8603936**, 2013.12.10, USA