

Sungyeon Heo

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EDUCATION

- Ph.D.** (08/2014 – present), Chemical Engineering
The University of Texas at Austin, Texas, USA
Advisor: Prof. Delia Milliron
- M.S.** (03/2012 – 02/2014), Chemical and Biomolecular Engineering
Yonsei University, Seoul, Korea
Advisor: Prof. Jong Hak Kim
- B.S.** (03/2006 – 02/2012), Chemical Engineering
Yonsei University, Seoul, Korea
Advisor: Prof. Jong Hak Kim

AWARDS AND HONORS

- Excellent Paper Award, Yonsei University Graduate School (Awarded to a graduate student distinguished by outstanding research accomplishments) (11/2013)
- Best Poster Presentation Award, 2013 Korean Institute of Chemical Engineers (KIChE) Spring Meeting
- National Science and Technology Scholarship, Government of South Korea (2010-2011)
- University Designated Scholarship, Yonsei University (1st semester 2007)
- Awarded Honors, Yonsei University (1st semester 2011, 2nd semester 2010, 1st semester 2006)
- Awarded the Highest Honors, Yonsei University (2nd semester 2011, 2nd semester 2006)

TEACHING EXPERIENCES

Undergraduate Courses

- Mass Transport Phenomena (1st semester, 2012), Chemical Engineering Design (1st semester, 2012), Polymer Engineering (2nd semester, 2012), Thesis (2nd semester, 2012)

Graduate Course

- Current Trends in Chemical Engineering Technology (1st semester, 2013)

LABORATORY & TECHNICAL SKILLS

Synthesis and fabrication skills

- Synthesis of organic materials (synthesis graft copolymer by atomic transfer radical polymerization (ATRP), synthesis of conductive polymers (PEDOT) by electrochemical polymerization and solution-casting polymerization, synthesis of monodisperse polystyrene and SiO₂ sphere)
- Synthesis of inorganic nanoparticles (sol-gel method, hydrothermal method)
- Synthesis of mesoporous inorganic films
- Patterning (micro- and nano-patterning with PDMS and high-resolution PFPE-based mold)

- Fabrication of dye-sensitized solar cells
- Colloid sphere assembly (photonic crystal, monolayer coating)

Software operating skills: MATLAB, ChemDraw, MS Office, Origin, ImageJ, Rhinoceros

Hardware operating skills: SEM, TGA, GPC, XRD, FT-IR spectroscopy, UV spectroscopy, DLS, EDS, Photovoltaic analysis (IPCE, EIS, Solar Simulator, IMPS, IMVS), Cyclic voltammetry

PUBLICATIONS

1. **Sung Yeon Heo**, Jong Kwan Koh, Jin Kyu Kim, Chang Soo Lee and Jong Hak Kim*, “Three-dimensional Conducting Polymer Films for Pt-free Counter Electrodes in Dye-sensitized Solar Cells”, *Electrochimica Acta*, 2014,137, 34-40.
2. **Sung Yeon Heo**, Jung Tae Park, Rajkumar Patel, Jin Kyu Kim and Jong Hak Kim*, “One-step Fabrication of Crack-free, Hierarchically-ordered TiO₂ Films via Self-assembly of Polystyrene Bead and Preformed TiO₂”, *Electrochimica Acta*, 2014,117, 521-527.
3. **Sung Yeon Heo**⁺, Jong Kwan Koh⁺, Gumin Kang, Sung Hoon Ahn, Won Seok Chi, Kyoungsik Kim and Jong Hak Kim*, “Bifunctional Moth-Eye Nanopatterned Dye-Sensitized Solar Cells: Light Harvesting and Self-Cleaning Effects”, *Advanced Energy Materials*, 2014, 4, 1300632. (+Equal contribution) (Front Cover)
4. **Sung Yeon Heo**, Dong Jun Kim, Harim Jeon, Bumsuk Jung, Yong Soo Kang and Jong Hak Kim*, “Vertically Aligned Anatase TiO₂ Nanotubes On Transparent Conducting Substrates Using Polycarbonate Membranes”, *RSC Advances*, 2013, 3,13681-13684.
5. Won Seok Chi, Dong Kyu Roh, Sang Jin Kim, **Sung Yeon Heo** and Jong Hak Kim*, “Hybrid Electrolytes Prepared From Ionic Liquid-Grafted Alumina for High-Efficiency Quasi-solid-state Dye-Sensitized Solar Cells”, *Nanoscale*, 2013,5, 5341-5348.
6. Sung Hoon Ahn, Won Seok Chi, Dong Jun Kim, **Sung Yeon Heo** and Jong Hak Kim*, “Honeycomb-like Organized TiO₂ Photoanodes with Dual Pores for Solid-State Dye-Sensitized Solar Cells”, *Advanced Functional Materials*, 2013, 23, 3901-3908. (Inside Front Cover)
7. Sang Jin Kim, Dong Jun Kim, **Sung Yeon Heo**, Hyungju Ahn, Du Yeol Ryu and Jong Hak Kim*, “Micron-thick, Worm-like, Organized TiO₂ Films Prepared Using Polystyrene-b-poly(2-vinyl pyridine) Block Copolymer and Preformed TiO₂ for Solid-state Dye-Sensitized Solar Cells”, *Electrochimica Acta*, 2013, 105, 15-22.

Domestic journal:

8. **Sung Yeon Heo**, Won Seok Chi, Jin Kyu Kim, Chang Soo Lee and Jong Hak Kim*, “Dye-sensitized Solar Cells Fabricated with TiO₂ Nanowires/Nanoparticles Photoanodes”, *Rapid Communication in Photoscience*, 2013, 2, 82-84.

SELECTED PRESENTATIONS

1. **Sung Yeon Heo**, Jong Kwan Koh, Jeonghun Kim, Eunkyong Kim and Jong Hak Kim, “Unprecedented Increase in Light Harvest of Dye-Sensitized Solar Cells with Nanopatterning”, (Poster), 9th World Congress of Chemical Engineering, Seoul, Korea (08/2013)
2. **Sung Yeon Heo**, Harim Jeon, Jinkyu Kim and Jong Hak Kim, “Highly Reflective Counter Electrode with Bragg

Stack Layers for Solid-State Dye-Sensitized Solar Cells”, (Poster), 3rd China-Korea Joint Workshop on Polymer Photonics, Changchun, China (07/2013)

3. **Sung Yeon Heo**, Jong Kwan Koh, Won Seok Chi, Jeong Woo Han, Hyun Joo Lee and Jong Hak Kim, “Electrostatically Assembled Nickel Sulfide Nanoparticles for Pt-free Counter Electrode of Dye-Sensitized Solar Cells”, (Poster), 2013 KICHe Spring Meeting, Gwangju, Korea (04/2013)

SOCIAL ACTIVITIES & EXPERIENCES

CLUB ACTIVITY

- Table Tennis Club, Yonsei University (2007–2008)

VOLUNTEERING

- Volunteer Service, Yonsei Severance Hospital (03/2010–06/2010)
- Mentoring and tutoring for a disadvantaged elementary school student (12/2006–01/2007)

MILITARY SERVICE

- Sergeant, Driver in 30th Regiment of the 9th division, The Republic of Korea Army (02/2008–01/2010)