

## BIOGRAPHICAL SKETCH: Sang Eon Han (updated 3/8/2018)

### Education and Training

Seoul National University	Chemical Engineering	B.S., 1996
Seoul National University	Chemical Engineering	M.S., 1998
University of Minnesota	Chemical Engineering	Ph.D., 2009
Massachusetts Institute of Technology	Mechanical Engineering	Postdoc, 2009-2012

### Research and Professional Experience

Chief Scientific Officer, Osazda Energy & Osazda Materials, Albuquerque, NM, USA, 2016-present  
Assistant Professor, Center for High Technology Materials, University of New Mexico, Albuquerque, NM, USA, 2015-present.  
Assistant Professor, Department of Chemical and Biological Engineering, University of New Mexico, Albuquerque, NM, USA, 2012-present.  
Research Scientist, LG Chem. Research Park, Daejeon, Korea, 1998-2003. The successful scale-up of optical polarizers for liquid crystal displays led to \$150 million in new sales in 2003.

### Honors and Awards

2016	NSF CAREER Award
2016, 2017	STC Innovation Award
2013	Oak Ridge Associated Universities Ralph E. Powe Junior Faculty Enhancement Award
2007	DoWonSuk Memorial Award
2003-2007	Fellowship from the Samsung Lee Kun Hee Scholarship Foundation
2001	Industrial Innovation Award from Korea Ministry of Commerce, Industry, and Energy
2001	LG R&D Award
2001	LG Chem R&D Award

### Selected Publications

- S. Atigyanun, J. Plumley, S. J. Han, K. Hsu, J. Cytrynbaum, T. L. Peng, S. M. Han, and **S. E. Han**<sup>\*</sup>, “Effective Radiative Cooling by Paint-Format Microsphere-Based Photonic Random Media,” *ACS Photon.* DOI: [10.1021/acsp Photonics.7b01492](https://doi.org/10.1021/acsp Photonics.7b01492) (2018).
- S. Atigyanun, M. Zhou, O. K. Abudayyeh, S. M. Han, and **S. E. Han**<sup>\*</sup>, “Control of randomness in microsphere-based photonic crystals assembled by Langmuir-Blodgett process,” *Langmuir* **33**, [13783–13789](https://doi.org/10.1021/acs.langmuir.7b01492) (2017).
- S. J. Han, S. Ghosh, O. K. Abudayyeh, B. R. Hoard, E. C. Culler, J. E. Bonilla, S. M. Han, and **S. E. Han**<sup>\*</sup>, “Symmetry-breaking nanostructures on crystalline silicon for enhanced light-trapping in thin film solar cells,” *Opt. Express* **24**, [A1586-A1596](https://doi.org/10.1364/OE.24.01586) (2016).
- D. Lee<sup>\*</sup> and **S. E. Han**, “Chiral nanocomposites: Hand-twisting light,” *Nature Mater.* **15**, [377-378](https://doi.org/10.1038/nmat4588) (2016).
- J. H. Park, **S. E. Han**, P. Nagpal, and D. J. Norris<sup>\*</sup>, “Observation of thermal beaming from tungsten and molybdenum bull’s eyes,” *ACS Photon.* **3**, [494-500](https://doi.org/10.1021/acsp Photonics.7b01492) (2016).
- M. S. Branham, W.-C. Hsu, S. Yerci, J. Loomis, S. V. Boriskina, B. R. Hoard, **S. E. Han**, A. Ebong, and G. Chen<sup>\*</sup>, “Empirical comparison of random and periodic surface light-trapping structures for ultrathin silicon photovoltaics,” *Adv. Opt. Mater.* **4**, [858-863](https://doi.org/10.1002/adom.201600040) (2016).
- **S. E. Han**<sup>\*</sup>, “Suppression of infrared absorption in nanostructured metals by controlling Faraday inductance and electron path length,” *Opt. Express* **24**, [2577-2589](https://doi.org/10.1364/OE.24.02577) (2016).
- M. S. Branham, W.-C. Hsu, S. Yerci, J. Loomis, S. V. Boriskina, B. R. Hoard, **S. E. Han**, and G.

Chen\*, “15.7% efficient 10- $\mu$ m-thick silicon photovoltaics using periodic nanostructures,” [\*Adv. Mater.\* \*\*27\*\*, 2182-2188 \(2015\).](#)

- T. Cai and **S. E. Han**\*, “Effect of symmetry in periodic nanostructures on light trapping in thin film solar cells,” [\*J. Opt. Soc. Am. B\* \*\*32\*\*, 2264-2270 \(2015\).](#)
- **S. E. Han**\* and S. M. Clark, “Optical properties of metamaterial serpentine metal electrodes,” [\*AIP Advances\* \*\*4\*\*, 123002 \(2014\).](#)
- S. M. Clark and **S. E. Han**\*, “Two-dimensional metamaterial transparent metal electrodes for infrared optoelectronics,” [\*Opt. Lett.\* \*\*39\*\*, 3666-3669 \(2014\).](#)
- Mavrokefalos, **S. E. Han**, S. Yerci, M. S. Branham, and G. Chen\*, “Efficient light-trapping in inverted nano-pyramid thin crystalline silicon membranes for solar cell applications,” [\*Nano Lett.\* \*\*12\*\*, 2792-2796 \(2012\).](#)
- **S. E. Han** and G. Chen\*, “Toward the Lambertian limit of light trapping in thin nanostructured silicon solar cells,” [\*Nano Lett.\* \*\*10\*\*, 4692-4696 \(2010\).](#)
- **S. E. Han** and G. Chen\*, “Optical absorption enhancement in silicon nanohole arrays for solar photovoltaics,” [\*Nano Lett.\* \*\*10\*\*, 1012-1015 \(2010\).](#)
- **S. E. Han** and D. J. Norris\*, “Beaming thermal emission from hot metallic bull’s eyes,” [\*Opt. Express\* \*\*18\*\*, 4829-4837 \(2010\).](#)
- **S. E. Han** and D. J. Norris\*, “Control of thermal emission by selective heating of periodic structures,” [\*Phys. Rev. Lett.\* \*\*104\*\*, 043901 \(2010\).](#)
- **S. E. Han**\*, “Theory of thermal emission from periodic structures,” [\*Phys. Rev. B\* \*\*80\*\*, 155108 \(2009\).](#)
- P. Nagpal, **S. E. Han**, A. Stein, and D. J. Norris\*, “Efficient low-temperature thermophotovoltaic emitters from metallic photonic crystals,” [\*Nano Lett.\* \*\*8\*\*, 3238-3243 \(2008\).](#)
- N. R. Denny, **S. E. Han**, D. J. Norris, and A. Stein\*, “Effects of thermal processes on the structure of monolithic tungsten and tungsten alloy photonic crystals,” [\*Chem. Mater.\* \*\*19\*\*, 4563-4569 \(2007\).](#)
- **S. E. Han**, A. Stein, and D. J. Norris\*, “Tailoring self-assembled metallic photonic crystals for modified thermal emission,” [\*Phys. Rev. Lett.\* \*\*99\*\*, 053906 \(2007\).](#)  
[Selected for *Virtual Journal of Nanoscale Science & Technology* **16**, Issue 7, August 13 (2007)]

### Synergistic Activities

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|--------------|--|
| 2014-present | Chair, AIChE, Nanomaterials for Thermal-to-Electric Conversion, Nanomaterials for Light Harvesting and Novel Photophysical Phenomenon, Nanoelectronic and Photonic Materials, Nanostructured/Thin Film Photovoltaics |
| 2015         | Mentor of elementary school teachers for NSF Research Experience for Teachers  |