

Kihoon Kim

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Education

- 8/2017 – 8/2022 Ph.D. in Chemical Engineering**
University of Texas at Austin, Austin, TX, USA
Dissertation: “Properties Control of Individual Metal Oxide Nanocrystal and Their Assembled Structures”
(Advisor: Prof. Delia Milliron)
- 2/2010 - 2/2012 M.S. in Chemical and Biomolecular Engineering**
Sogang University, Seoul, South Korea
Dissertation: “Surface-enhanced Raman Scattering of Vertically Oriented Gold Nanorods on Fluid-fluid Interface”
(Advisor: Prof. Taewook Kang)
- 2/2006-2/2010 B.S. in Chemical and Biomolecular Engineering / Integrated Biotechnology**
Sogang University, Seoul, South Korea

Work Experience

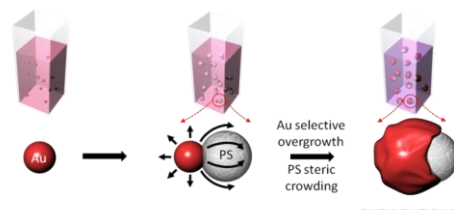
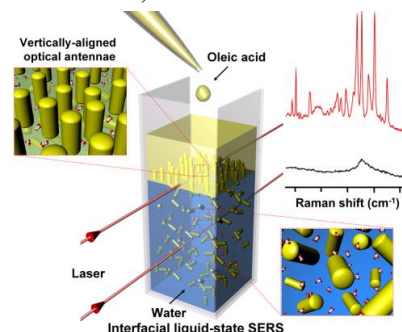
- 6/2012 - 1/2016 Researcher (Special research agent for military service)**
OCI Company LTD., Central R&D Center, Seongnam-si, South Korea
Project Name: Development of Metal Composite Paste for c-Si Solar Cell Front Grid

Key Publications

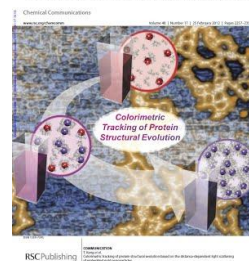
Papers

1. **K. Kim**, Z. Sherman, A. Cleri, J. Maria, J. Maria, T. Truskett and D. J. Milliron, “Tuning Optical Parameters of Nanocrystal-based Optical Metamaterials by Doping at Atomic and Mesoscopic Lengthscales”, *In preparation*.
2. Z. Sherman, **K. Kim**, J. Kang, S. B. Roman, H. Crory, D. Conrad, S. Valenzuela, E. Lin, M. Dominguez, S. Gibbs, E. Anslyn, D. Milliron, and T. Truskett, “Plasmonic Response of Nanoparticle Assemblies”, *Submitted to Nature Materials*.
3. **K. Kim**, J. Yoo, J. Noh, L.C. Reimnitz, M. Chang, D. R. Gamelin, B.A. Korgel, G.S. Hwang and D.J. Milliron “Synthetic Control of Intrinsic Defects Formation in Metal Oxide Nanocrystals Using Ionized Spectator Metal Salts”, *Submitted to Nature Chemistry*.
4. Y.J. Son, S. Kim, V. Leung, K. Kawashima, J. Noh, **K. Kim**, R. Marquez, O. Carrasco-Jaim, L. Smith, H. Celio, D. J. Milliron, B. A. Korgel, C. Mullins, “Effects of Electrochemical Conditioning on Nickel-Based Oxygen Evolution Electrocatalysts”, *ACS Catalysis-Under Revision*.

5. **K. Kim**, L.C. Reimnitz, S.H. Cho, J. Noh, Z. Dong, S.L. Gibbs, B.A. Korgel, D.J. Milliron “Effect of Non-incorporative Cations on the Size and Shape of Indium Oxide Nanocrystals,” *Chemistry of Materials*, 32, 9347, (2020). *‘Selected as a’ Front Cover’*.
6. S.H. Cho, K.M. Roccapiore, C.K. Dass, S. Ghosh, J. Choi, J. Noh, L.C. Reimnitz, S. Heo, **K. Kim**, K. Xie, B.A. Korgel, X. Li, J.R. Hendrickson, J.A. Hachtel, and D.J. Milliron “Spectrally Tunable Infrared Plasmonic F₂Sn:In₂O₃ Nanocrystal Cubes,” *Journal of Chemical Physics*, 152 (2020).
7. **K. Kim***, H. S. Han*, I. Choi, C. Lee, S. Hong, S. Suh, L. P. Lee and T. Kang “Interfacial Liquid-state Surface-enhanced Raman Spectroscopy”, *Nature Communications*, 4, 2182, (2013). (*Equal Contribution)
8. **K. Kim***, E. Jeong*, I. Choi*, S. Jeong, Y. Park, H. Lee, S. H. Kim, L. P. Lee, Y. Choi and T. Kang, “Three-dimensional Reduced-symmetry of Colloidal Plasmonic Nanoparticles”, *Nano Letters*, 12(5), 2436, (2012). (*Equal Contribution)
9. 3. I. Choi, Y. I. Yang, E. Jeong, **K. Kim**, S. Hong, T. Kang and J. Yi “Colorimetric Tracking of Protein Structural Evolution Based on the Distance-dependent Light Scattering of Embedded Gold Nanoparticles”. *Chemical Communications*, 48, 2286, (2011). *‘Selected as an Inside Front Cover’*.
10. 4. Y. I. Yang, E. Jeong, I. Choi, S. Lee, H. D. Song, **K. Kim** Y. Choi, T. Kang, and J. Yi, “Simultaneous Optical Monitoring of the Overgrowth Modes of Single Asymmetric Hybrid Nanoparticles”, *Angewandte Chemie International Edition*, 50 (20), 4633, (2011). *‘Selected as a’ Cover Page Article’ and ‘Hot Paper’*.



ChemComm



Angewandte Chemie International Edition



Patents (Issued)

1. M. Oh, **K. Kim**, and S. K. Kang, “Nonhomogeneity Cu-Ni Composite and Method for Synthesizing Thereof” Korean Patent No. 1017033860000, (2017).
2. S. K. Kang, **K. Kim**, M. Oh, and H. R. Kim, “Electrolytic Plating Electrode and Plating Apparatus Comprising Thereof”, Korean Patent No. 1016645400000, (2016).
3. **K. Kim**, S. K. Kang, and M. Oh, “Method for Manufacturing Metal Complex”, Korean Patent No. 1016761310000, (2016).

4. **K. Kim**, S. K. Kang, and M. Oh, “Front Electrode of Solar Cell and Method for Manufacturing the Same”, Korean Patent No. 1016331920000, (2016).

5. **K. Kim**, S. K. Kang, M. Oh and H. R. Kim, “Preparing Method of Metal Complex Having Excellent Surface Properties”, U.S. Patent No. 20150079414, Japanese Patent No. 27059271, Chinese Patent No. 104439271, Korean Patent No. 1013003210000, (2015).

6. **K. Kim**, C. Lee, H. S. Han, T. Kang, “Device for Detecting SERS Active Particles at a Liquid-liquid Interface”, Korean Patent No. 1013397310000, (2013).

7. **K. Kim**, C. Lee, H. S. Han, T. Kang, “Assay Method Using SERS Active Particles at a Liquid-liquid Interface”, Korean Patent No. 1013003210000, (2013).

Presentations

➤ *International*

1. **K. Kim**, J. Yu, J. Noh, L. C. Reimnitz, M. Chang, D. R. Gamelin, B. A. Korgel, G. S. Hwang and D. J. Milliron, “Control of intrinsic defects in metal oxide nanocrystals using non-incorporative metal salts”, ACS Spring Meeting (2022).

2. **K. Kim**, H. S. Han, C. Lee, E. Jeong, S. Jeong and T. Kang, “Surface-enhanced Raman Scattering (SERS) of Self-oriented Colloidal Gold Nanorods”, Materials Research Society Fall Meeting, (2011).

3. **K. Kim**, E. Jeong, Y. Park, Y. Choi, H. Lee, and T. Kang, “Steric Hindrance-mediated Fabrication of Asymmetric Plasmonic Nanoparticles in a Solution”, Materials Research Society Fall Meeting, (2011).

4. C. Lee, **K. Kim**, E. Jeong, S. Jeong, H. S. Han, W. Lee, and T. Kang, “Self-Orientation of Nanoparticles at the Oil/Water Interface”, Materials Research Society Fall Meeting, (2011).

5. **K. Kim**, E. Jeong, Y. Park, I. Choi, H. Lee, S. H. Kim, L. P. Lee, Y. Choi, and T. Kang, “Controlled Overgrowth of Gold on Gold/PS Dimeric Nanoparticle in a Solution”, IEEE NMDC, (2011).

6. **K. Kim**, H. S. Han, C. Lee, E. Jeong, S. Jeong and T. Kang, “Self-assembly of Plasmonic Nanoparticles on Fluid-fluid Interface for Surface-enhanced Raman Scattering”, IEEE NMDC, (2011).

7. C. Lee, **K. Kim**, E. Jeong, S. Jeong, H. S. Han, W. Lee, and T. Kang, “Orientation and Position of Nanoparticle at the Oil/Water Interface”, IEEE NMDC, (2011).

➤ *Domestic*

1. C. Lee, **K. Kim**, and T. Kang, “Synthesis of Multifunctional Au Nanorod : Magnetic Core

Inside”, The Korean Society of Industrial and Engineering Chemistry Spring Meeting, (2011).

2. **K. Kim**, H. S. Han, C. Lee, E. Jeong, S. Jeong and T. Kang, “Label-free Optical Sensing of Self-aligned Plasmonic Nanoantennae on a Liquid-liquid Interface”, The Korean Society of Industrial and Engineering Chemistry Fall Meeting, (2011).

3. **K. Kim**, H. S. Han , C. Lee, E. Jeong, S. Jeong, and T. Kang, “Mass Transfer-Driven Pre-concentration on Fluid-fluid Interface for Optical Sensing”, The Korean Society of Industrial and Engineering Chemistry Fall Meeting, (2011).

4. S. Jeong, **K. Kim**, H. S. Han, C. Lee, E. Jeong, and T. Kang, “Wet Chemical Synthesis of Magnetic-Plasmonic Nanoantenna”, The Korean Society of Industrial and Engineering Chemistry Fall Meeting, (2011).

5. **K. Kim**, S. Lee, Y. I. Yang, J. Yi, Y. Choi, and T. Kang, “A Novel Strategy to Realize Ratiometric Detection Using Metallic Nanoparticles”, Korean Institute of Chemical Engineers Fall Meeting, (2010).

6. **K. Kim**, E. Jeong, Y. Choi, L. P. Lee, and T. Kang, “Innovative Solution-based Approach to Synthesize Gold Nanocrescent”, Korean Institute of Chemical Engineers Fall Meeting, (2010).

Detailed Research Experience

8/2017-8/2022 [UT Austin, NSF] Synthesis of Metal Oxide Nanocrystals (NCs) and Their Application to Optics Based on Self-assembled Structure

- Morphology control of metal oxide NCs
- Control of intrinsic defects of metal oxide NCs
- Empirical study of defective indium oxide band structure and its application
- Development of plasmon based optical metamaterial using metal oxide NCs

6/2012-1/2016 [OCI] Development of Metal Paste for c-Si Solar Cell Front Grid Using Metal Composite Microparticle

- Synthesis of Cu microparticle
- Synthesis of Ag coated Cu, Cu-alloy microparticle (10~40 wt % Ag coating)
- Paste rheology test & resistivity measurement

2/2010-2/2012 [Sogang Univ.] Synthesis of Noble Metal Nanoparticle and Their Optical Applications Based on Self-assembled Structure

- Synthesis of gold nanoparticle and studying growth mechanism using optical microscope (Collaboration with Seoul National University)
- Assembly of anisotropic gold nanoparticle at the liquid-liquid interface and its optical application based on surface-enhanced Raman scattering (SERS) (Collaboration with University of California at Berkeley)
- Development of gastric cancer diagnosis system based on SERS (Collaboration with Catholic Univ. of Korea Seoul ST. Mary’s Hospital)

Techniques and Skills

1. Material Fabrication and Process

- Synthesis of inorganic colloids (metals and semiconductors)
- Defect (both extrinsic and intrinsic) engineering of semiconductor NCs
- Surface functionalization of inorganic NCs
- Assembly of nanoparticles
- Paste formulation and printing

2. Characterization

- Spectroscopy (FT-IR, UV-Vis, Ellipsometry, (Surface-enhanced) Raman and PL)
- Microscopy (STEM, TEM and Darkfield OM)
- Elemental analysis (XPS, ICP-OES and EDX)
- X-ray/scattering (XRD, SAXS and DLS)
- Conductivity measurement (4-Point-Probe)
- Thermogravimetric analysis (TGA)

3. Software

- Data processing (Origin)
- 3D rendering (Rhino Ceros and Blender)
- XPS (CasaXPS)
- Image processing (Gatan and ImageJ)
- Crystal structure analysis (Vesta, Jade and FullProf)
- Optical parameter analysis (CompleteEASE)

Teaching & Other Activities

1. Teaching Assistant, Chemical Engineering Process and Project Laboratory, the University of Texas at Austin (1/2021-5/2021).
2. Teaching Assistant, Chemical Engineering Process and Project Laboratory, Chemical Engineering, UT Austin (1/2019-5/2019).
3. Teaching Assistant, Chemical Industry and Engineering Management, Chemical and Biomolecular Engineering, Sogang University (2/2011 - 6/2011).
4. Teaching Assistant, Core Experiment 2 in Chemical Engineering, Chemical and Biomolecular Engineering, Sogang University (9/2010 – 12/2010).
5. Teaching Assistant, Capstone Design in Chemical & Biomolecular Engineering, Chemical and Biomolecular Engineering, Sogang University (2/2010 – 6/2010).
6. Teaching Assistant, Applied Organic Chemistry, Chemical and Biomolecular Engineering, Sogang University (2/2010 – 6/2010).

Awards and Fellowship

1. Frank and Marian Trogus Endowed Graduate Fellowship in Chemical Engineering (2020).