

Curriculum Vitae

Name : Sanghwa Jeong

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Education

2009.03 ~ 2015.02 (Ph.D.) Physical Chemistry, Pohang University of Science and Technology

2005.03 ~ 2009.02 (B.S.) Department of Chemistry (major) and Physics (minor), Pohang University of Science and Technology

Research Experience

2017.01~Current University of California, Berkeley, United States

Supervisor : Prof. Markita Landry – Department of Chemical and Biomolecular Engineering

Postdoctoral Fellow, Developing toolkits for *in vivo* molecular optical imaging via near infrared-emitting nano-sized probes.

2015.03~2016.11 Pohang University of Science and Technology (POSTECH), Pohang, South Korea

Supervisor : Prof. Sungjee Kim – Department of Chemistry

Postdoctoral Fellow, 1) Developing multiplexed (multispectral) fluorescent quantum dots in the second near-infrared region (1000-1700 nm, NIR-II). Performing realtime *in vivo* multiplexed NIR-II fluorescent imaging for cancer-targeting quantum dot probe. 2) Optimizing the surface modification of PbS/CdS core/shell quantum dot with the encapsulation of amphiphilic polymer for biological application. 3) Conducting the intercalation of quantum dot into layered double hydroxide clay for stabilized quantum dot solid. Conducting the fabrication of NIR-II emitting glass with quantum dot-clay composite in arsenic trisulfide glass. 4) Synthesizing the plasmonic silver nanosphere and nanorod, and studying the sulfuration process from silver nanostructure to silver sulfide nanostructure.

2009.03~2015.02 Pohang University of Science and Technology (POSTECH), Pohang, South Korea

Supervisor : Prof. Sungjee Kim – Department of Chemistry

PhD Candidate, 1) Installation of NIR-II fluorescence wide-field imaging setup, and study about the optical imaging capability of NIR-II region in comparison to visible and conventional first near-infrared region (650-950 nm). 2) Development of protease-sensitive activatable (“turn-on”) type NIR-II quantum dot probe for tumor-microenvironment detection. 3) Study of *in-situ* self-assembly of cadmium chalcogenide quantum dots into superstructure with exotic intermediates during pyrolysis method. 4) Synthesis of Mn-doped Ag₂S and CuInS₂ quantum dots for

photomagnetic modulation. 5) Preparation of high-loaded quantum dot-silica composite as bright fluorescent glass film. 6) Conducting *in vivo* multiplexed imaging by using upconverting NaYF₄:Yb, Tm nanoparticle and CdTeSe quantum dot. 7) Preparation of stretchable broadband photodetector by using the QD-conducting polymer composites.

Various and specialized experience of synthesis and surface modification of inorganic nanoparticles including CdSe/CdS/ZnS, CdS, CdTe, CdTeSe, InP/ZnS, CuInS₂/ZnS, PbS/CdS, PbS/CdS/ZnS, PbSe/PbSe, Ag₂S quantum dots, NaYF₄:Yb, Tm, NaYF₄:Yb, Er nanoparticles, Au nanosphere, nanorod, Ag nanosphere, nanorod. Extensive experience of electron microscopy, fluorescence spectroscopy, optical microscopy, optical imaging of animal model, cell culture.

2007.12~2008.1 University of Tokyo, Japan

Supervisor : Prof. Hiroshi Nishihara – Department of Chemistry

International Visiting Research Student, Characterization of catalytic activity in the inter-gallery of montmorillonite.

2007.9~2007.11 Pohang University of Science and Technology (POSTECH),
Pohang, South Korea

Supervisor : Prof. Moonho Ree – Department of Chemistry

Undergraduate Research Assistant, Synthesize the functional polymer structure and, study of X-ray diffraction pattern in crystalline polymer.

Research Interest

- Synthesis of bright and photo-stable colloidal semiconductor nanocrystals from visible to near-infrared region (400-1700 nm) by solvothermal route
- Surface modification of semiconductor nanocrystals for multifunctional bio-probes
- Development of the second near-infrared (1000-1700 nm) fluorescent probes for high-resolution deep tissue bioimaging

- Controlled self-assembly process of nanoparticles

Awards & Scholarships

2016.05	QD2016-JACS Best Poster Award (QD2016)
2011.03 ~ 2014.02	Presidential Fellowship, Pohang University of Science and Technology
2009. 09	Best Teaching Assistant Award, Experimental Analytical Chemistry
2009.03 ~ 2011.02	The Presidential Science Scholarship, Korea Student Aid Foundation
2009.03	Bong-Whan Kim and Young-Soon Hong Scholarship
2005.03 ~ 2009.02	National Science and Technology Scholarship

Publications

1. **Sanghwa Jeong**, Jaejung Song, Wonseok Lee, Yeon Mi Ryu, Yebin Jung, Sang-Yeob Kim, Kangwook Kim, Seong Cheol Hong, Seung Jae Myung, Sungjee Kim, “Cancer-Microenvironment-Sensitive Activatable Quantum Dot Probe in the Second Near-Infrared Window”, *Nano Lett.* **2017**, 17, 1378-1386.
2. Youngrong Park[†], **Sanghwa Jeong**[†], Sungjee Kim, “Medically Translatable Quantum Dots for Biosensing and Imaging”, *J. Photochem. Photobiol. C*, **2017**, 30, 51-70. ([†]equal contribution)
3. **Sanghwa Jeong**, Sekyu Hwang, Bumsu Kim, Hong Nam Nguyen, Jong Heo, and Sungjee Kim, “Preparation of Photostable Near Infrared Luminescent Glass with Quantum Dot-Layered Double Hydroxide Composites”, *J. Mater. Chem. C* **2016**, 4, 8624-8627.

4. **Sanghwa Jeong**, Hyunmi Doh, and Sungjee Kim, "Synthesis and Characterization of Paramagnetic and Near Infrared Photoluminescent Manganese-doped Silver Sulfide Quantum Dots", *submitted*
5. **Sanghwa Jeong**, Yebin Jung, Jaejung Song, Seoyeon Bok, G-One Ahn, and Sungjee Kim, "Multiplexed Second Near Infrared-Emitting Quantum Dots for In vivo Imaging Application", *submitted*
6. Juwon Park[†], **Sanghwa Jeong**[†], Jiwon Bang[†], Bomi Kim, Hyunmi Doh, Seungho Cho, Sungjae Hwang, and Sungjee Kim, "Formation and Stepwise Self-assembly of Cadmium Chalcogenide Nanocrystals to Colloidal Supra- Quantum Dots and the Superlattices", *Chem. Mater.* **2016**, 28, 5329-5335. ([†]equal contribution)
7. Jaejung Song, Jeesu Kim, Sekyu Hwang, Mansik Jeon, **Sanghwa Jeong**, Chulhong Kim, and Sungjee Kim, "'Smart' gold nanoparticles for photoacoustic imaging: an imaging contrast agent responsive to the cancer microenvironment and signal amplification via pH-induced aggregation", *Chem. Commun.*, **2016**, 52, 8287-8290.
8. Thanh Ha Cao, Jong Heo, Yong Kon Kwon, **Sanghwa Jeong**, Sungjee Kim, "Photoluminescence from PbS quantum dots and PbS/CdS core/shell quantum dots mixed with As₂S₃ glass", *J. Non-Cryst. Solids*, **2016**, 431, 76-78
9. Yebin Jung, **Sanghwa Jeong**, Nayoun Won, Boeun Ahn, Jungheon Kwag, Sang Geol Kim, Sungjee Kim, "Quantum dot imaging in the second near-infrared optical window: studies on reflectance fluorescence imaging depths by effective fluence rate and multiple image acquisition", *Journal of Biomedical Optics*, **2015**, 20 (4), 046012-046012.
10. Jewon Yoo, **Sanghwa Jeong**, Sungjee Kim and Jung Ho Je, "High performance stretchable nanowire UV-visible-NIR photodetector", *Adv. Mater.*, **2015**, 27, 1712-1717
11. Seungho Cho, Ji-Wook Jang, Juwon Park, Sungwook Jung, **Sanghwa Jeong**, Jungheon Kwag, Jae Sung Lee and Sungjee Kim, "Facile fabrication of two-dimensional inorganic nanostructures and their conjugation to nanocrystals", *J. Mater. Chem. C*, **2013**, 1, 4497-4504

12. Seungho Cho, Jungheon Kwag, **Sanghwa Jeong**, Yeonggyeong Baek, and Sungjee Kim, "Highly Fluorescent and Stable Quantum Dot-Polymer-Layered Double Hydroxide Composites", *Chem. Mater.*, **2013**, 25 1071-1077
13. Seungho Cho[†], Sungwook Jung[†], **Sanghwa Jeong**, Jiwon Bang, Joonhyuck Park, Youngrong Park and Sungjee Kim, "Strategy for Synthesizing Quantum Dot-Layered Double Hydroxide Nanocomposites and Their Enhanced Photoluminescence and Photostability", *Langmuir*, **2013**, 29 (1) 441-447 ([†]equally contributed)
14. Jutaek Nam, Nayoun Won, Jiwon Bang, Ho Jin, Joonhyuck Park, Sungwook Jung, **Sanghwa Jeong**, Youngrong Park and Sungjee Kim, "Surface engineering of inorganic nanoparticles for imaging and therapy", *Adv. Drug Del. Rev.*, **2013**, 65 (5) 622–648
15. Nayoun Won, **Sanghwa Jeong**, Kangwook Kim, Jungheon Kwag, Joonhyuck Park, Sang Geol Kim, and Sungjee Kim, "Imaging Depths of Near-Infrared Quantum Dots in First and Second Optical Windows", *Mol. Imaging*, **2012**, 11 (4) 338-52
16. **Sanghwa Jeong**, Nayoun Won, Jinsik Lee, Jiwon Bang, Jeongsoo Yoo, Sang Geol Kim, Jeong Ah Chang, Joonghyun Kim and Sungjee Kim "Multiplexed near-infrared in vivo imaging complementarily using quantum dots and upconverting NaYF₄:Yb³⁺,Tm³⁺ nanoparticles", *Chem. Commun.*, **2011**, 47, 8022-8024
17. **Sanghwa Jeong**, JinSik Lee, Jutaek Nam, Kyuhyun Im, Jaehyun Hur, Jong-Jin Park, Jong-Min Kim, Bonghwan Chon, Taiha Joo, Sungjee Kim "One-Step Preparation of Strongly Luminescent and Highly Loaded CdSe Quantum Dot-Silica Films", *J. Phys. Chem. C*, **2010**, 114(34), 14362-14367

Patents

1. Ju Taek Nam, Na Youn Won, **Sanghwa Jeong**, Hyo Kyun Chung, Sungjee Kim, pH sensitive metal nanoparticle and preparation method, Patent No. WO2010002217 A3

2. Sungjee Kim, Seung ho Cho, Jung Heon Kwag, **Sanghwa Jeong**, Synthesis of quantum dot/polymer/layered-structure ceramic composite, Patent No. WO2014073814 A1
3. Kyu-hyun Im, No-kyoung Park, Jae-hyun Hur, Sung-Jee Kim, Ju-taek Nam, Seong-Ho Park, **Sang-hwa Jeong**, Hydrogen peroxide sensitive metal nanoparticles, method for producing the same and hydrogen peroxide detection system comprising the same, Patent No. US20140065718 A1
4. Sung Jee Kim, **Sang Hwa Jeong**, Hyo Kyun Chung, Ju Taek Nam, Na Youn Won, pH Sensitive Metal Nanoparticle and Preparation Method, Patent No. US20110269170 A1
5. Sung Jee Kim, **Sang Hwa Jeong**, Hyo Kyun Chung, Ju Taek Nam, Na Youn Won, pH sensitive metal nanoparticle and preparation method, Patent No. EP2308799 A2

Academic Activities

1. The 118th General Meeting of the Korean Chemical Society, 2016, Poster Presentation
2. 2016 IBS Conference on Supramolecular Chemistry, Poster Presentation
3. QD 2016, 2016, Poster Presentation
4. The 116th General Meeting of the Korean Chemical Society, 2015, Oral Presentation
5. Pioneer NanoSeoul Forum, 2014, Poster Presentation
6. World Molecular Imaging Congress, 2014, Poster Presentation
7. Colloidal Semiconductor Nanocrystals, Gordon Conference, 2014, Poster Presentation
8. Nano Korea, 2012, Poster Presentation
9. Pioneer NanoSeoul Forum, 2011, Poster Presentation
10. SPIE Photonics West, 2011, Oral Presentation

11. The 106th General Meeting of the Korean Chemical Society, 2011, Poster Presentation
12. Materials Research Society Fall Meeting, 2009, Poster Presentation
13. The 103rd General Meeting of the Korean Chemical Society, 2009, Poster Presentation

Teaching Experience

2015.03 ~ 2015.06	Head Teaching Assitant, Department of Chemistry, Physical Chemistry II: Thermodynamics and kinetics, Pohang University of Science and Technology
2012.03 ~ 2012.12	Teaching Assistant, Research & Education Program, Daegu Science High School
2011.09 ~ 2011.12	Head Teaching Assistant, Department of Chemistry, Experimental Physical Chemistry, Pohang University of Science and Technology
2011.03 ~ 2011.12	Teaching Assistant, Research & Education Program, Daegu Science High School
2009.09 ~ 2009.12	Teaching Assistant, Department of Chemistry, Experimental Physical Chemistry, Pohang University of Science and Technology
2009.03 ~ 2009.07	Teaching Assistant, Department of Chemistry, Experimental Analytical Chemistry, Pohang University of Science and Technology