Bo Hyung Ryoo

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RESEARCH FOCUS

Inorganic/Physical Chemistry, Solid-State Materials, Nanoscience, Semiconductor, Finite-Magnets, Experiment *and* Theory.

EDUCATION

University of Pennsylvania, Department of Chemistry Philadelphia, PA
PhD Candidate in Inorganic and Materials Chemistry *Aug. 2023 - present*
Research Advisor: Chris B. Murray

University of Pittsburgh, Department of Chemistry Pittsburgh, PA
M.S. Inorganic Chemistry *Apr. 2016 - Sep. 2019*
Research Advisor: Jill E. Millstone

"Influence of Phosphine and Halide Ligands on the Properties of Undecagold Nanoclusters"

University of Pittsburgh, Department of Chemistry Pittsburgh, PA
Bachelor of Science in Chemistry *Aug. 2012 - Apr. 2016*
Minor: Physics

RESEARCH EXPERIENCE

University of Pennsylvania Philadelphia, PA
Graduate Student Researcher under Prof. Chris B. Murray *Aug. 2023 - present*

- Synthesized and analyzed heterodimerstructures of nanoparticles with various properties (magnetic, electric, optical, etc)
- Construct superlattices of nanoparticles to study and tune the collective material properties of the nanomaterials

SionTech Co. Ltd. Daejeon, S. Korea
Senior Researcher · Technical Research Personnel *Sep. 2019 - Sep. 2022*

- Designed and improved capacitative deionization (CDI) cells for commercial/industrial water purification
- Developed and tested new methods on large-scale chemical depolymerization of polyesters for plastic-recycling

University of Pittsburgh Pittsburgh, PA
Graduate Student Researcher under Prof. Jill E. Millstone *Apr. 2016 - Aug. 2019*

- Synthesized and analyzed atomically precise gold nanoclusters and understand their physical properties with the use of density functional theory (DFT)

University of Pittsburgh Pittsburgh, PA
Undergraduate Student Researcher for Prof. Jill E. Millstone *Sept. 2013 - Apr. 2016*

- Synthesized small gold nanoparticles (< 5nm) protected with various thiolated ligands and studied their properties using diverse analytical techniques

Carnegie Mellon University Pittsburgh, PA
Undergraduate Student Researcher for Prof. David Yaron *Apr. 2014 - Oct. 2014*

- Modelled small metal-containing molecules with hotbit density functional tight binding theory (DFTB) calculation on atomic simulation environment (ASE) for faster and accurate geometry optimization

PATENTS AND PUBLICATIONS

8. Kim, M-Y.; Kang, K-S.; Lee, K-H.; Ryoo, B-H. (Siontech Co, Ltd). Capacitive Deionization Electrode and Manufacturing Method Thereof. *US. Patent* US20230113091A1, Apr. 13, 2023. *patent pending* [granted in KR]
7. Ryoo, B-H.; Lee, K-H.; Kang, K-S.; Kang, S-W.; Kim, Y-H.; Do, S-A. (Siontech Co, Ltd). Chemical Recycling Method of Polyester-based Polymer Waste. *KR. Patent* KR102571563B1, Aug. 29, 2023.
6. Kang, K-S.; Lee, K-H.; Do, S-A.; Kang, S-W.; Ryoo, B-H. (Siontech Co, Ltd). Recovery Method for Bis-hydroxyethyl Terephthalate from Polyethylene Terephthalate. *KR. Patent* KR102604653B1, Nov. 23, 2023.
5. Kang, K-S.; Lee, K-H.; Lee, H-I.; Ryoo, B-H.; Park, N-S.; Lee, K-H. (Siontech Co, Ltd). Energy-saving Ion Adsorption/Desorption Water Purification Apparatus and Energy-saving Water Purification Method. *US. Patent* US11820680B2, Nov. 21, 2023.
4. Lee, K-H.; Ryoo, B-H.; Do, S-A.; Kang, K-S. (Siontech Co, Ltd). Capacitive Desalination Cell Performance Inspection Device. *KR. Patent* KR1020220067738, Nov. 1, 2022.
3. Kang, K-S.; Lee, K-H.; Park, N-S.; Yoo, H-W.; Ryoo, B-H. (Siontech Co., Ltd., Kyung Dong Navien Co., Ltd.). Deionization Electrode, Apparatus and Method for Deionization Electrode, Electrode Module and Deionization Module. *US. Patent* US11787711B2, Oct. 17, 2023.
2. Kang, K-S.; Lee, K-H.; Ryoo, B-H. (Siontech Co., Ltd.). Apparatus and Method for Removing Boron Contained in Radioactive Waste Liquid. *KR. Patent* KR102346894B1, Jan. 4, 2022.
1. S.E. Crawford, C.M. Andolina, D.C. Kaseman, B-H. Ryoo, A.M. Smith, K.A. Johnston, J. E. Millstone, "Efficient Energy Transfer from Near-Infrared Emitting Gold Nanoparticles to Pendant Ytterbium(III)", *J Am Chem Soc.* **139(49)**, 17767-17770 (2017).

FELLOWSHIPS AND AWARDS

- Art & Science Tuition Scholarship *Fall 2017 - Spring 2018*
  University of Pittsburgh
- Summer Research Fellowship *Summer 2016*
  University of Pittsburgh