

CURRICULUM VITAE



Jong Hyun Park

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#Research ID: AAN-5927-2020

➤ Education

2012.03 ~ 2016.08: Bachelor of Engineering/ Bachelor of Science

Ulsan National Institute of Science and Technology (UNIST).

Major: *Nano Materials Engineering / Physics*

2016.09 ~ 2021.08: Combined Master & Ph. D

Department of Materials Science and Engineering,

Ulsan National Institute of Science and Technology (UNIST).

Major: *Materials Science Engineering*

*Research advisor: Prof. Myoung Hoon Song.

➤ Professional Experience

2023.09~ Present: *Assistant Professor*

Chonnam National University, School of Chemical Engineering

2021.09. ~ 2023.08: *Staff Engineer*

Samsung Electronics, DRAM Process Architecture Team

➤ Research Interest

- Optoelectronics based on metal halide perovskite (LEDs, SCs, photodetector, etc.).
- Synthesis of colloidal perovskite nanocrystals and ligand engineering.
- Halide perovskite memristor for neuromorphic computing.

➤ RESEARCH EXPERIENCE AND SKILLS

✓ Fabrication of metal halide perovskite based optoelectronic devices.

1. Fabrication of perovskite based optoelectronic devices with p-i-n and n-i-p structures (LEDs, SCs, etc.).
2. Surface and interfacial engineering for device performance and stability enhancement.
3. Selection of optimal charge transporting layers for the device optimization.

✓ Colloidal perovskite nanocrystals synthesis.

1. Colloidal nanocrystals synthesis via hot-casting method and ligand assisted reprecipitation techniques (LARP).
2. Solid and solution-state ligand exchange of perovskite nanocrystals.
3. Bandgap tuning of perovskite nanocrystals via anion exchanges.

✓ Morphology and structure control for perovskites.

1. Bandgap engineering of perovskite films via various cations and anions composition control.
2. Bandgap engineering of perovskite films via dimensional control (2D, and quasi-2D).
3. Perovskite films grain size controls via temperature controls, additives, polymer blending, etc.

➤ PUBLICATION

✓ 1st Author Papers

† *Equally contributed as first author.*

1. **Jong Hyun Park**†; Young Wook Noh†; Jung Min Ha†; Amit Kumar Harit; Ayushi Tripathi; Jeongjae Lee; Bo Ram Lee; Myoung Hoon Song*; Han Young Woo*, "Anionic conjugated polyelectrolyte as a semiconducting additive for highly efficient and stable perovskite solar cells", *ACS Applied Materials & Interfaces*, xx, xx-xx (2023).

2. Ah-young Lee†, **Jong Hyun Park**†, Hongju Kim†, Hu Young Jeong*, Jun Hee Lee*, Myoung Hoon Song*, “Blue Perovskite Nanocrystal Light-Emitting Diodes: Overcoming Ruddlesden-Popper Fault-Induced Nonradiative Recombination via Post-Halide Exchange”, *Small*, 18, 2205011 (2022).
3. Hyeonjung Kim†; **Jong Hyun Park**†; Kangyoung Kim; Dongryeol Lee; Myoung Hoon Song*; Jongnam Park*, “Highly Emissive Blue Quantum Dots with Superior Thermal Stability via In Situ Surface Reconstruction of Mixed CsPbBr₃-Cs₄PbBr₆ Nanocrystals”, *Advanced Science*, 9, 2104660 (2022).
4. Yasser Hassan†; **Jong Hyun Park**†; Michael L. Crawford; Aditya Sadhanala; Jeongjae Lee; James C. Sadighian; Edoardo Mosconi; Ravlchandran Shlvanna; Eros Radicchi; Mingyu Jeong; Changduk Yang; Hyosung Choi; Sung Heum Park; Myoung Hoon Song; Cathy Y. Wong*; Richard H. Friend; Bo Ram Lee*; Henry J. Snaith*, “Ligand-Engineered Bandgap Stability in Mixed-Halide Perovskite LEDs”, *Nature*, 591, 72 (2021).
5. **Jong Hyun Park**; Amit Kumar Harit; Chung Hyeon Jang; Ji-Eun Jeong; Han Young Woo*; Myoung Hoon Song*, “Efficient Green-Emitting Perovskite Light-Emitting Diodes Using a Conjugated Polyelectrolyte Additive”, *Materials Today Energy*, 21, 100755 (2021).
6. **Jong Hyun Park**; Chung Hyeon Jang; Eui Dae Jung; Seungjin Lee*; Myoung Hoon Song*; Bo Ram Lee*, “A-site Cation Engineering for Efficient Blue-Emissive Perovskite Light-Emitting Diodes”, *Energies*, 13, 6689 (2021).
7. Ji-Eun Jeong†; **Jong Hyun Park**†; Chung Hyeon Jang; Myoung Hoon Song; Han Young Woo*, “Multifunctional Charge Transporting Materials for Perovskite Light Emitting Diodes”, *Advanced Materials*, 32, 2002176 (2020).
8. **Jong Hyun Park**; Ah-young Lee; Jae Choul Yu; Yun Seok Nam; Yonghoon Choi; Jongnam Park; Myoung Hoon Song*, “Surface Ligand Engineering for Efficient Perovskite Nanocrystal-Based Light-Emitting Diode”, *ACS Applied Materials & Interfaces*, 11, 8425-8435 (2019).
9. Seungjin Lee†; **Jong Hyun Park**†; Yun Seok Nam; Bo Ram Lee; Baodan Zhao; Daniele Di Nuzzo; Eui Dae Jung; Hansol Jeon; Ju-Young Kim; Hu Young Jeong; Richard H.

Friend; Myoung Hoon Song*, “Growth of Nano-Sized Single Crystals for Efficient Light-Emitting Diode”, *ACS Nano*, 12, 4, 3417-3423 (2018).

✓ **Full List of Papers**

10. **Jong Hyun Park**[†]; Young Wook Noh[†]; Jung Min Ha[†]; Amit Kumar Harit; Ayushi Tripathi; Jeongjae Lee; Bo Ram Lee; Myoung Hoon Song*; Han Young Woo*, "Anionic conjugated polyelectrolyte as a semiconducting additive for highly efficient and stable perovskite solar cells", *ACS Applied Materials & Interfaces*, xx, xx-xx (2023).
1. Ah-young Lee[†], **Jong Hyun Park**[†], Hongju Kim[†], Hu Young Jeong*, Jun Hee Lee*, Myoung Hoon Song*, “Blue Perovskite Nanocrystal Light-Emitting Diodes: Overcoming Ruddlesden-Popper Fault-Induced Nonradiative Recombination via Post-Halide Exchange”, *Small*, 18, 2205011 (2022).
2. Zhongkai Yu[†], Woo Hyeon Jeong[†], Keehoon Kang[†], Hochan Song, Xinyu Shen,^a Hyungju Ahn, Seok Woo Lee, Xiangyang Fan, Ji Won Jang, Su Ryong Ha, Jeong Wan Min, **Jong Hyun Park**, Jongmin Han, Eui Dae Jung, Myoung Hoon Song, Dong Wook Chang, Won Bin Im, Sung Heum Park, Hyosung Choi*, Bo Ram Lee*, “A polymer/small-molecule binary-blend hole transport layer for enhancing charge balance in blue perovskite light emitting diodes”, *Journal of Materials Chemistry A*, 9, 13928 (2022).
3. Hyeonjung Kim[†]; **Jong Hyun Park**[†]; Kangyoung Kim; Dongryeol Lee; Myoung Hoon Song*; Jongnam Park*, “Highly Emissive Blue Quantum Dots with Superior Thermal Stability via In Situ Surface Reconstruction of Mixed CsPbBr₃-Cs₄PbBr₆ Nanocrystals”, *Advanced Science*, 9, 2104660 (2022).
4. Amit Kumar Harit; Eui Dae Jung; Jung Min Ha; Jong Hyun Park; Ayushi Tripathi; Young Wook Noh; Myoung Hoon Song*; Han Young Woo*, “Triphenylamine-Based Conjugated Polyelectrolyte as a Hole Transport Layer for Efficient and Scalable Perovskite Solar Cells”, *Small*, 18 (2022).
5. Woo Hyeon Jeong; Zhongkai Yu; Luca Gregori; Jonghee Yang; Su Ryong Ha; Ji Won Jang; Hochan Song; Jong Hyun Park; Eui Dae Jung; Myoung Hoon Song; Sung Heum

- Park; Henry J. Snaith; Alberto Boretti; Fillippo De Angelis; Daniele Meggiolaro*; Jeongjae Lee*; Hyosung Choi*; Bo Ram Lee*, “In Situ Cadmium Surface Passivation of Perovskite Nanocrystals for Blue LEDs”, *Journal of Materials Chemistry A*, 9, 26750 (2021).
6. **Jong Hyun Park**; Amit Kumar Harit; Chung Hyeon Jang; Ji-Eun Jeong; Han Young Woo*; Myoung Hoon Song*, “Efficient Green-Emitting Perovskite Light-Emitting Diodes Using a Conjugated Polyelectrolyte Additive”, *Materials Today Energy*, 21, 100755 (2021).
 7. Yasser Hassan†; **Jong Hyun Park**†; Michael L. Crawford; Aditya Sadhanala; Jeongjae Lee; James C. Sadighian; Edoardo Mosconi; Ravlchandran Shlvanna; Eros Radicchi; Mingyu Jeong; Changduk Yang; Hyosung Choi; Sung Heum Park; Myoung Hoon Song; Cathy Y. Wong*; Richard H. Friend; Bo Ram Lee*; Henry J. Snaith*, “Ligand-Engineered Bandgap Stability in Mixed-Halide Perovskite LEDs”, *Nature*, 591, 72 (2021).
 8. Yanliang Liu; Zhongkai Yu; Shi Chen; **Jong Hyun Park**; Eui Dae Jung; Seungjin Lee; Keehoon Kang; Seo-Jin Ko; Jongchul Lim; Myoung Hoon Song; Baomin Xu; Henry J. Snaith; Sung Heum Park*; Bo Ram Lee*, “Boosting the Efficiency of Quasi-2D Perovskites Light-Emitting Diodes by Using Encapsulation Growth Method”, *Nano Energy*, 80, 105511 (2021).
 9. Ji-Eun Jeong†; **Jong Hyun Park**†; Chung Hyeon Jang; Myoung Hoon Song; Han Young Woo*, “Multifunctional Charge Transporting Materials for Perovskite Light Emitting Diodes”, *Advanced Materials*, 32, 2002176 (2020).
 10. **Jong Hyun Park**; Chung Hyeon Jang; Eui Dae Jung; Seungjin Lee*; Myoung Hoon Song*; Bo Ram Lee*, “A-site Cation Engineering for Efficient Blue-Emissive Perovskite Light-Emitting Diodes”, *Energies*, 13, 6689 (2021).
 11. Zhongkai Yu; Su Ryoung Ha; **Jong Hyun Park**; Eui Dae Jung; Woo Hyeon Jong; Seongbeom Kim; Myoung Hoon Song; Jong-Man Kim; Sung Heum Park; Hyosung Choi*; Bo Ram Lee*, “Water-stable Polymer Hole Transport Layer in Organic and Perovskite Light-Emitting Diodes”, *Journal of Power Sources*, 478, 228810 (2020).

12. Chung Hyeon Jang; Amit Kumar Harit; Seungjin Lee; Su Hwan Kim; Ji-Eun Jeong; **Jong Hyun Park**; Eui Dae Jung; Sang Kyu Kwak*; Han Young Woo*; Myoung Hoon Song*, “Sky-Blue-Emissive Perovskite Light-Emitting Diodes: Crystal Growth and Interfacial Control Using Conjugated Polyelectrolytes as a Hole-Transporting Layer”, *ACS Nano*, 14, 13246 (2020).
13. Eui Dae Jung; Amit Kumar Harit; Do Hui Kim; Chung Hyeon Jang; **Jong Hyun Park**; Shinuk Cho*; Myoung Hoon Song*; Han Young Woo*, “Multiply Charged Polyelectrolytes as a Multifunctional Interlayer for Efficient and Scalable Perovskite Solar Cells”, *Advanced Materials*, 30, 202333, (2020).
14. Jun Tae Kim; Jihoon Lee; Soyeong Jang; Zongkai Yu; **Jong Hyun Park**; Eui Dae Jung; Seungjin Lee; Myoung Hoon Song; Dong Ryeol Whang; Sangwook Wu; Sung Heum Park*; Dong Wook Chang*; Bo Ram Lee*, “Solution Processable Small Molecules as Efficient Electron Transport Layers in Organic Optoelectronic Devices”, *Journal of Material Chemistry A*, 8, 13501 (2020).
15. Da Bin Kim; Seungjin Lee; Chung Hyeon Jang; **Jong Hyun Park**; Ah-young Lee; Myoung Hoon Song*, “Uniform and Large-Area Cesium-Based Quasi-2D Perovskite Light-Emitting Diodes Using Hot-Casting Method”, *Advanced Materials Interfaces*, 7, 1902158 (2020).
16. Hemin Zhang; **Jong Hyun Park**; Woo Jin Byun; Myoung Hoon Song; Jae Sung Lee*, “Activating Surface and Bulk Hematite Photoanodes to Boost Solar Water Splitting”, *Chemical Science*, 10, 10346-10444 (2019).
17. **Jong Hyun Park**; Ah-young Lee; Jae Choul Yu; Yun Seok Nam; Yonghoon Choi; Jongnam Park; Myoung Hoon Song* “Surface Ligand Engineering for Efficient Perovskite Nanocrystal-Based Light-Emitting Diode”, *ACS Applied Materials & Interfaces*, 11, 8425-8435 (2019).
18. Jae Choul Yu; **Jong Hyun Park**; Sang Yun Lee; Myoung Hoon Song*, “Effect of Perovskite Film Morphology on Device Performance of Perovskite Light-Emitting Diodes”, *Nanoscale*, 11, 1505-1514 (2019).

19. Yasser Hassan; Olivia J. Ashton; **Jong Hyun Park**; Guangru Li; Nobuya Sakai; Bernard Wenger; Amir-Abbas Haghighirad; Nakita K. Noel; Myoung Hoon Song; Bo Ram Lee*; Richard H. Friend; Henry J. Snaith*, “Facile Synthesis of Stable and Highly Luminescent Methylammonium Lead Halide Nanocrystals for Efficient Light Emitting Devices”, *Journal of the American Chemical Society*, 141, 1269-1279 (2019).
20. Seungjin Lee; Da Bin Kim; Jae Choul Yu; Chung Hyeon Jang; **Jong Hyun Park**; Bo Ram Lee; Myoung Hoon Song*, “Versatile Defect Passivation Methods for Metal Halide Perovskite Materials and their Application to Light-Emitting Devices”, *Advanced Materials*, 31, 1805244 (2019).
21. Bo Ram Lee; Jae Choul Yu; **Jong Hyun Park**; Seungjin Lee; Chen-Kang Mai; Baodan Zhao; Matthew S. Wong; Eui Dae Jung; Yun Seok Nam; Song Yi Park; Daniele Di Nuzzo; Jin Young Kim; Samuel D. Stranks; Guillermo C. Bazan; Hyosung Choi*; Myoung Hoon Song*; Richard H. Friend*, “Conjugated Polyelectrolytes as Efficient Hole Transport Layers in Perovskite Light-Emitting Diodes”, *ACS Nano*, 12, 5826-5833 (2018).
22. Seungjin Lee†; **Jong Hyun Park**†; Yun Seok Nam; Bo Ram Lee; Baodan Zhao; Daniele Di Nuzzo; Eui Dae Jung; Hansol Jeon; Ju-Young Kim; Hu Young Jeong; Richard H. Friend; Myoung Hoon Song*, “Growth of Nano-Sized Single Crystals for Efficient Light-Emitting Diode”, *ACS Nano*, 12, 4, 3417-3423 (2018).
23. Seungjin Lee; **Jong Hyun Park**; Bo Ram Lee; Eui Dae Jung; Jae Choul Yu; Daniele Di Nuzzo; Richard H. Friend; Myoung Hoon Song*, “Amine-Based Passivating Materials for Enhanced Optical Properties and Performance of Organic-Inorganic Perovskite in Light-Emitting Diodes”, *The Journal of Physical Chemistry Letters*, 8, 8, 1784-1792 (2017).
24. Da Bin Kim; Jae Choul Yu; Yun Seok Nam; Dae Woo Kim; Eui Dae Jung; Sang Yun Lee; Seungjin Lee; **Jong Hyun Park**; Ah-young Lee; Bo Ram Lee; Daniele Di Nuzzo; Richard H. Friend; Myoung Hoon Song*, “Improved Performance of Perovskite Light-Emitting Diodes Using PEDOT:PSS and MoO₃ Composite Layers”, *Journal of Materials Chemistry C*, 4, 8161-8165, (2016).
25. Jae Choul Yu; Dae Woo Kim; Da Bin Kim; Eui Dae Jung; **Jong Hyun Park**; Ah-young Lee; Bo Ram Lee; Daniele Di Nuzzo; Richard H. Friend; Myoung Hoon Song*,

“Improving the Stability and Performance of Perovskite Light-Emitting Diodes by Thermal Annealing Treatment”, *Advanced Materials*, 82, 6906-6913 (2016).

26. Bo Ram Lee; Seungjin Lee; **Jong Hyun Park**; Eui Dae Jung; Jae Choul Yu; Yun Seok Nam; Jinhee Heo; Ju-Young Kim; Byeong-Su Kim*; Myoung Hoon Song*, “Amine-Based Interfacial Molecular for Inverted Polymer-Based Optoelectronic Devices”, *Advanced Materials*, 27, 3533-3559 (2015)

➤ **PATENTS**

1. Myoung Hoon Song, Seungjin Lee, **Jong Hyun Park**, “Preparing method of optoelectronic device for organic or inorganic hybrid perovskite coated with amine-based passivating materials”, Korea, 10-2017-0046028.
2. Myoung Hoon Song, Seungjin Lee, **Jong Hyun Park**, “Efficient method to grow defect free perovskite for LED application”, Korea, 10-2017-0121825.

➤ **Scholarship & Awards**

- Gold Prize (HumanTech Paper Award by Samsung)

➤ **PRESENTATIONS (INTERNATIONAL CONFERENCE)**

1. Seungjin Lee; **Jong Hyun Park**; Eui Dae Jung; Jae Choul Yu; Myoung Hoon Song, “Amine-Based Passivating Materials for Enhanced Optical Properties and Performance of Perovskite in Light-Emitting Diodes”, 2018 MRS Spring Meeting & Exhibit, Phoenix, Arizona, USA, **2018**.
2. **Jong Hyun Park**; Seungjin Lee; Yun Seok Nam; Bo Ram Lee; Baodan Zhao; Daniele Di Nuzzo; Eui Dae Jung; Hansol Jeon; Ju-Young Kim; Hu Young Jeong; Richard H. Friend; Myoung Hoon Song, “Growth of Nano-Sized Single Crystals for Efficient Perovskite

Light-Emitting Diodes”, 4th International Conference on Perovskite Solar Cell and Optoelectronics, EPFL, Switzerland, **2018**.

3. Myoung Hoon Song; Seungjin Lee; **Jong Hyun Park**; Jae Choul Yu; Eui Dae Jung; Bo Ram Lee; Dainiele Di Nuzzo; Richard H. Friend, “Enhanced Performance of Organic-Inorganic Hybrid Perovskite Optoelectronic Light-Emitting Diodes by Surface Engineering”, 2018 MRS Spring Meeting & Exhibit, Phoenix, Arizona, USA, **2018**.
4. Da Bin Kim; Jae Choul Yu; Yun Seok Nam; Dae Woo Kim; Eui Dae Jung; Sang Yun Lee; Seungjin Lee; **Jong Hyun Park**; Ah-Young Lee; Myoung Hoon Song, “Increase the Performance of Perovskite LEDs Using PEDOT:PSS:MoO₃ Composite Layers”, 2018 MRS Spring Meeting & Exhibit, Phoenix, Arizona, USA, **2018**.
5. Seungjin Lee; **Jong Hyun Park**; Jin Young Kim; Myoung Hoon Song, “Amine-Based Passivating Materials for Efficient Perovskite in Light-Emitting Diodes”, 3rd International Conference on Perovskite Solar Cell and Optoelectronics, Oxford, UK, **2017**.

➤ REFERENCE

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