Seungju Seo

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INTERESTS

- Opto-electronic, optical devices (Image Sensor, Display, Optical component, etc.)
- Thin Film (Optical Design, Deposition, Stress, Characterization, etc.)
- MEMS (Micro-Electro-Mechanical Systems) Process and its Applications (Etching, Lithography, etc.)

EDUCATION

The University of Tokyo - Tokyo, Japan **March 2021**

Ph. D. Department of Mechanical Engineering (major) & Technology Management for Innovation (minor)

- Thesis: Functionalizations of single-walled carbon nanotubes and their application on solar cells (supervised by Prof. Maruyama)

M. Eng. Department of Mechanical Engineering ***with highest distinction*** **March 2018**

- Thesis: Application of nano-carbon materials on perovskite solar cells (supervised by Prof. Maruyama)
- Research featured in The Nikkei newspaper (2018.2.26 P.9 morning paper), UTokyo webpage (http://www.t.u-tokyo.ac.jp/foe/press/setnws_20171218113937120559287 4.html)

Waseda University - Tokyo, Japan **March 2016**

B. Eng. Department of Applied Mechanics and Aerospace Engineering

- Thesis: Three-dimensional numerical analysis of indoor air flow in air-conditioning system (supervised by Prof. Ohta)

Massachusetts Institute of Technology - Cambridge, USA **Jan. 2017 – Feb. 2017 / Jan. 2019 - June 2019**

Visiting Student Department of Mechanical Engineering (Mechanosynthesis group led by Prof. A. John Hart)

- Project: Crust removal of Carbon Nanotube Forests using O_2 / Ar plasma

Visiting Student Department of Mechanical Engineering (Jeehwan Kim group led by Prof. Jeehwan Kim)

- Project: 2D Material-based micro-LED / Remote epitaxial growth of single crystalline oxides with graphene.

WORK EXPERIENCE

Apple – Yokohama, Japan **January 2020 – September 2020**

Panel Process and Optics (Thin Film) –Internship

- Supported component optical coating, failure analysis and mitigation solution for new optical device concepts and advanced technology
- Worked with external vendors and internal teams for process qualification and DOEs

Bloomberg – Yokohama, Japan **October 2019 – December 2019**

Bloomberg New Energy Finance – Research Analyst Internship

- Assisted with quantitative analysis, market sizing, regulatory research and forecasting reasonable estimates regarding emerging PV technologies

Republic of Korea Army – Daegu, South Korea **April 2012 – January 2014**

Private – Sergeant (Mandatory military service)

- Led an infantry team of 10 members in combat operations providing tactical guidance.

FELLOWSHIP &AWARD

- Scholarship: Tokyu Foundation / Fuji-seal Foundation / Monbukagakusho Honors (2011.4 ~ 2018.3)
- University of Tokyo, School of Engineering, Dean's award (2018.3)
- Japan Society of Mechanical Engineers (JSME) Miura award (2018.3)
- Japan Society for the Promotion of Science Research Fellowship DC1 (2018.4 ~ 2021.3)
- Uenohara Award (2019.6)
- Best Poster Award at 10th A3 Symposium on Emerging Materials (2019.10)

PUBLICATIONS

- C. Delacou, I. Jeon, **S. Seo** et al., 「Indium tin oxide-free small molecule organic solar cells using single-walled carbon nanotube electrodes」, *ECS J. Solid State Sci. Technol.*, 6(6), M3181-M3184 (2017.5)
- I. Jeon[1st], **S. Seo**[1st] et al., 「Perovskite Solar Cells using Carbon Nanotubes both as Cathode and Anode」, *J. Phys. Chem. C*, 121(46), 25743-25749 (2017.10)
- I. Jeon, R. Sakai, **S. Seo** et al., 「Engineering high-performance and air-stable PBTZT-stat-BDTT-8: PC 61 BM/PC 71 BM organic solar cells」, *J. Mater. Chem. A*, 6, 5746-5751, (2018.2)
- I. Jeon, H. Ueno, **S. Seo** et al., 「Lithium-Ion Endohedral Fullerene (Li+@C60) Dopant in Stable Perovskite Solar Cells Inducing Anti-Oxidation」, *Angew. Chem. Int. Ed.*, 57(17), 4607-4611 (2018.2) Selected as VIP Paper

- H. Lin, I. Jeon, R. Xiang, **S. Seo** et al., 「Achieving High Efficiency in Solution-Processed Perovskite Solar Cells Using C_{60}/C_{70} Mixed Fullerenes」, *ACS Appl. Mater. Interfaces*, 10(46), 39590-39598, (2018.9)
- J. Lee, I. Jeon, H. Lin, **S. Seo** et al., 「Vapor-Assisted Ex-Situ Doping of Carbon Nanotube toward Efficient and Stable Perovskite Solar Cells」, *Nano Lett.,* 19(4), 2223-2230 (2018.12)
- A. Thote, I. Jeon, J. Lee, **S. Seo** et al., 「Stable and Reproducible 2D/3D Formamidinium-Lead-Iodide Perovskite Solar Cells」, *ACS Appl. Energy Mater.* 2(4), 2486-2493 (2019.3)
- **S. Seo**[1st], I. Jeon[1st] et al., 「Semiconducting carbon nanotubes as crystal growth templates and grain bridges in perovskite solar cells」, *J. Mater. Chem. A*, 7, 12987-12992, (2019.5)
- I. Jeon, A. Shawky, H. Lin, **S. Seo** et al., 「Controlled Redox of Lithium-ion Endohedral Fullerene for Efficient and Stable Metal Electrode-Free Perovskite Solar Cells」, *J. Am. Chem. Soc.*, 16553-16558 (2019.9)
- Y. Qian, I. Jeon, Y. Ho, C. Lee, S. Jeong, C. Delacou, **S. Seo** et al., 「Multifuntional effect of p-Doping, Antireflection, and Encapsulation by Polymeric Acid for High Efficiency and Stable Carbon Nanotube-Based Silicon Solar Cells」, *Adv. Energy Mater*., 1902389 (2020.1)
- H. S. Kum, H. Lee, S. Kim, S. Lindemann, **S. Seo** et al., 「Heterogeneous integration of single-crystalline complex-oxide membranes」, *Nature,* 578(7793), 75-81 (2020.1)
- I. Jeon, A. Shawky, **S. Seo** et al., 「Carbon nanotubes to outperform metal electrodes in perovskite solar cells via dopant engineering and hole-selectivity enhancement」, *J. Mater. Chem. A,* 8, 11141-11147 (2020.5)
- Y. Qian[1st], **S. Seo**[1st], I. Jeon[1st] et al., 「MoS2-carbon nanotube heterostructure as efficient hole transporters and conductors in perovskite solar cells」, *Appl. Phys. Express,* 13(7) (2020.7)
- H. Lin, J. Lee, J. Han, C. Lee, **S. Seo** et al., 「Denatured M13 Bacteriophage-Templated Perovskite Solar Cells Exhibiting High Efficiency」, *Adv. Sci.,* 2000782 (2020.8)
- W. Jang, B. G. Kim, **S. Seo** et al., 「Strong dark current suppression in flexible organic photodetectors by carbon nanotube transparent electrodes」, *Nano Today,* 37, 101081 (2021.4)
- **S. Seo**, S. Kim, S. Maruyama, A. J. Hart et al., 「Tailoring the surface morphology of carbon nanotube forests by plasma etching: a parametric study」, under revision.
- **S. Seo**, K. Akino, S. Maruyama et al., 「MoO_3 Doping of Carbon Nanotube Top Electrodes for Highly Efficient Metal-Electrode-Free Perovskite Solar Cells」, to be submitted.

SKILLS & QUALIFICATIONS

Engineering Skills

- Process: Lithography (E-beam, photo), Deposition (CVD, ALD, PVD, Evaporation, Sputtering), RIE, Dicing, etc.
- Characterization: I-V, C-V, Impedance, XRD, XPS, EDX, Raman, PL, SEM, UV-vis, AFM, USPM, FT-IR, Ellipsometry, GD-OES, TGA, Stress measurement, etc.
- Software: Microsoft Office, SolidWorks, LabView, COMSOL, AutoCAD, etc.
- Programming: Python, C, R, MATLAB

Language:

- English: Fluent / Japanese: Native / Korean: Native

Extracurricular:

- President of Korean Students Association at the University of Tokyo (2018.1 ~ 2019.2)

Certification:

- Microsoft Office Specialist (Word, Excel, PowerPoint, Outlook)

REFERENCES

(Available if required)

- Prof. Shigeo Maruyama | Distinguished Professor, D. Eng.
  Department of Mechanical Engineering, The University of Tokyo, Japan
  E-mail: maruyama@photon.t.u-tokyo.ac.jp
- Prof. Jeehwan Kim | Associate Professor, D. Eng.
  Department of Mechanical Engineering, Massachusetts Institute of Technology
  E-mail: jeehwan@mit.edu
- Prof. A. John Hart | Professor, D. Eng.
  Department of Mechanical Engineering, Massachusetts Institute of Technology
  E-mail: ajhart@mit.edu
- Prof. Yan Li | Cheung Kong Professor, D. Chem.
  Department of Chemistry and Molecular Engineering, Peking University, China
  E-mail: yanli@pku.edu.cn
- Prof. Sanha Kim | Assistant Professor, D. Eng.
  Department of Mechanical Engineering, Korea Advanced Institute of Science and Technology
  E-mail: sanhkim@kaist.ac.kr