

# Curriculum Vitae

## Personal Data

---

Name: Changyeon Lee  
Date of Birth: 05.13.1989  
Gender: Male  
Nationality: Republic of Korea  
Business Address: Towne 345, 220 South 33<sup>rd</sup> Street, Philadelphia, PA19104  
E-mail: [cymodric@seas.upenn.edu](mailto:cymodric@seas.upenn.edu), [cymodric@gmail.com](mailto:cymodric@gmail.com)  
Cell Phone: +1-215-512-7864

## Education

---

09/2019– Present Postdoctoral Researcher  
University of Pennsylvania, Chemical and Biomolecular Engineering  
Research advisor: Prof. Chinedum O. Osuji

03/2018– 08/2019 Visiting scholar  
University of Pennsylvania, Chemical and Biomolecular Engineering  
Research advisor: Prof. Chinedum O. Osuji

03/2018– 08/2019 Postdoctoral researcher  
Korea Advanced Institute of Science and Technology (KAIST)  
Research advisor: Prof. Bumjoon J. Kim

03/2014– 02/2018 Ph.D. Chemical & Biomolecular Engineering  
Korea Advanced Institute of Science and Technology (KAIST)  
Research advisor: Prof. Bumjoon J. Kim

03/2012– 02/2014 M.S. Chemical & Biomolecular Engineering  
Korea Advanced Institute of Science and Technology (KAIST)  
Research advisor: Prof. Bumjoon J. Kim

03/2008– 02/2012 B.S. Chemical Engineering  
Hanyang University, Republic of Korea

## Research Experience

---

- **Fabrication of organic electronics:**
  - Organic photovoltaics
  - Organic light-emitting diodes
- **Material Design:**
  - N-type polymers for high-performance all-polymer solar cells
  - water/alcohol-soluble *p*, *n*-type semiconducting materials for eco-friendly polymer solar cells

- 
- **Characterization of conjugated polymers (for studies on the structure-property relationship):**
    - Qualitative/quantitative analyses on structural and morphological properties using X-ray tools
    - Imaging using microscopies
    - Characterization of electrical properties of conjugated polymer films (e.g. space-charge limited current (SCLC) method, analyses of J-V characteristics)
  
  - **Liquid crystals and liquid-crystalline macromolecules:**
    - Understanding self-assembly of liquid crystalline materials in bulk and thin film
    - Nanopatterning using liquid-crystalline block copolymers
    - Magnetic-field alignment of liquid crystalline materials
    - Developing functional materials (e.g. LC elastomers for soft actuators)
  
  - **Skills:**
    - X-ray tools: SAXS, WAXS, GISAXS/GIWAXS, RSoXS
    - Imaging tools: AFM/TEM/POM
    - Others: GPC, DSC, TGA, CV, UPS, UV-vis/PL, Contact angle, etc.

## Awards and Honors

---

11/2017	Invited to the Inter-Academy Seoul Science Forum 2017 (IASSF 2017) as a <u>Rising Researcher</u> , hosted by The Korean Academy of Science and Technology (KAST), and sponsored by Ministry of Science and ICT.
06/2016	Best Poster Award, The International Conference on Science and Technology of Synthetic Metals in 2016 (ICSM 2016).
04/2016	Best Oral Presentation Award, 2016 Global Photovoltaic Conference (GPVC).
03/2014– 03/2016	<u>Global Ph.D. Fellowship</u> Supported by National Research Foundation of Korea; this is the most prestigious scholarship program in Korea for the purpose of nurturing world-class scientists and only ~10 chemical engineering graduate students in nation receive this fellowship each year.

## Research Outcome

---

Publications	11 SCI papers as a leading author 29 SCI papers as a co-author
Citations/ H-index	<b>Total citation: 3206/</b> H-index: 24 (google scholar, 08/2021)
Patents	6 Patents (1 United States and 5 domestic)
Presentation in international conferences	6 Oral presentation (2 Material Research Society (MRS), Global Photovoltaic Conference, Top-PV, PRCR) 6 Poster presentation

---

## Featured Publications (as a leading author)

14	<b>Changyeon Lee</b> , Dennis Ndaya, Reuben Bosire, Rajeswari M. Kasi, Chinedum O. Osuji, "Magnetic Field-Aligned Superlattice by Binary Blends of Block Polymers and Block Oligomers", in preparation
13	Youngwoo Choot, Manesh Gopinadhant, <b>Changyeon Lee</b> †, Masafumi Fukuto, Ruipeng Li, Dennis Ndaya, Reuben Bosire, Lalit Mahajan, Rajeswari M. Kasi, Chinedum O. Osuji, "Uniaxial Texture of Face-Centered Cubic Block Copolymer Micelles via Symmetry Breaking under Magnetic Field", in preparation, † = Equal contribution
12	<b>Changyeon Lee</b> , Dennis Ndaya, Reuben Bosire, Rajeswari M. Kasi, Chinedum O. Osuji, "Ultrafast and Photoswitchable Order-to-Disorder Transition of Azobenzene-based Liquid-Crystalline Block Co-Oligomers", in preparation
11	<b>Changyeon Lee</b> , Chinedum O. Osuji, "100th Anniversary of Macromolecular Science Viewpoint: Opportunities for Liquid Crystal Polymers in Nanopatterning and Beyond", <i>ACS Macro Lett.</i> <b>2021</b> , <i>10</i> , 945.
10	<b>Changyeon Lee</b> , Dennis Ndaya, Reuben Bosire, Uri R. Gabinet, Jian Sun, Padma Gopalan, Rajeswari M. Kasi, Chinedum Osuji, "Effects of Labile Mesogens on the Morphology of Liquid Crystalline Block Copolymers in Thin films", <i>Macromolecules</i> , <b>2021</b> , <i>54</i> , 3223.
9	<b>Changyeon Lee</b> *, Junbok Lee, Seungjin Lee, Wonho Lee, Hoseon You, Han Young Woo, Bumjoon J. Kim, "Importance of Device Structure and Interlayer Design in Storage Stability of Naphthalene Diimide-Based All-Polymer Solar Cells", <i>Journal of Materials Chemistry A</i> , <b>2020</b> , <i>8</i> , 3735. * = <b>Corresponding author</b>
8	<b>Changyeon Lee</b> †, Seungjin Lee†, Geon-U Kim, Wonho Lee, Bumjoon J. Kim, "Recent Advances, Design Guidelines and Prospects of All-Polymer Solar Cells", <i>Chem. Rev.</i> , <b>2019</b> , <i>119</i> , 8028. † = Equal contribution
7	<b>Changyeon Lee</b> , Hae Rang Lee, Joonhyeong Choi, Youngkwon Kim, Thanh Luan Nguyen, Wonho Lee, Joon Hak Oh, Han Young Woo, Bumjoon J. Kim, "Aqueous-Processed Organic Solar Cells and Transistors: Impact of Water Addition on Processability and Thin-Film Morphologies of Electroactive Materials", <i>Adv. Energy Mater.</i> <b>2018</b> , <i>8</i> , 34.
6	<b>Changyeon Lee</b> , Hyunbum Kang, Wonho Lee, Taesu Kim, Ki-Hyun Kim, Han Young Woo, Cheng Wang, Bumjoon J. Kim, "High Performance All-Polymer Solar Cells via Side Chain Engineering of Polymer Acceptor: Importance of Polymer Packing Structure and Nanoscale Blend Morphology", <i>Adv. Mater.</i> , <b>2015</b> , <i>27</i> , 2466. <b>Citations: 251</b>
5	<b>Changyeon Lee</b> , Dong Jin Kang, Hyunbum Kang, Taesu Kim, Junwoo Park, Jaeho Lee, Seunghyup Yoo, Bumjoon J. Kim, "Simultaneously Enhancing Light Extraction and Device

	Stability of Organic Light-Emitting Diodes using a Corrugated Polymer Nanosphere Templated PEDOT:PSS Layer”, <i>Adv. Energy Mater.</i> , <b>2014</b> , 4, 1301345 ( <b>Cover article</b> ).
4	<b>Changyeon Lee</b> , Thota Giridhar, Joonhyeong Choi, Seonha Kim, Youngwoong Kim, Taesu Kim, Wonho Lee, Han-Hee Cho, Cheng Wang, Harald Ade, and Bumjoon J. Kim, "Importance of 2D Conjugated Side Chains of Benzodithiophene-Based Polymers in Controlling the Polymer Packing, Interfacial Ordering and Composition Variations of All-Polymer Solar Cells", <i>Chem. Mater.</i> , <b>2017</b> , 29, 9407 ( <b>a top download paper for the month of October</b> ).
3	Thanh Luan Nguyent, <b>Changyeon Lee</b> †, Hyeon Kim, Youngwoong Kim, Wonho Lee, Joon Hak Oh, Bumjoon Kim, Han Young Woo, "Ethanol-Processable, Highly-Crystalline Conjugated Polymers for Eco-Friendly Fabrication of Organic Transistors and Solar Cells", <i>Macromolecules</i> , <b>2017</b> , 50, 4415. † = Equal contribution
2	<b>Changyeon Lee</b> †, Yuxiang Li†, Wonho Lee, Youngmin Lee, Joonhyeong Choi, Taesu Kim, Cheng Wang, Enrique D. Gomez, Han Young Woo, and , Bumjoon J. Kim, "Correlation Between Phase-Separated Domain Sizes of Active Layer and Photovoltaic Performances in All-Polymer Solar Cells", <i>Macromolecules</i> , <b>2016</b> , 49, 5051.
1	Bomee Jang†, <b>Changyeon Lee</b> †, Young Woong Lee, Donguk Kim, Mohammad Afsar Uddin, Felix Sunjoo Kim, Bumjoon J. Kim, Han Young Woo, "A High Dielectric N-type Small Molecular Acceptor Containing Oligoethyleneglycol Side-Chains for Organic Solar Cells", <i>Chin. J. Chem.</i> , <b>2018</b> , 36, 199.

### Other Publications (as a co-author)

29	Uri R. Gabinet, <b>Changyeon Lee</b> , Ryan Poling-Skutvik, Daniel Keane, Na Kyung Kim, Ruiqi Dong, Zachariah Vicars, Yusheng Cai, Aniket U. Thosar, Alexander Grun, Sarah M. Thompson, Amish J. Patel, Cherie R. Kagan, Russell J. Composto, and Chinedum O. Osuji, "Nanocomposites of 2D-MoS2 Exfoliated in Thermotropic Liquid Crystals", <i>ACS Materials Lett.</i> <b>2021</b> , 3, 704.
28	Yizhou Zhang, Ruiqi Dong, Uri R. Gabinet, Ryan Poling-Skutvik, Na Kyung Kim, <b>Changyeon Lee</b> , Omar Q. Imran, Xunda Feng, Chinedum O. Osuji, "Rapid Fabrication by Lyotropic Self-Assembly of Thin Nanofiltration Membranes with Uniform 1 Nanometer Pores", <i>ACS Nano</i> , <b>2021</b> , 15, 8192.
27	Jin Su Park, Nayoun Choi, <b>Changyeon Lee</b> , Seungjin Lee, Jong-Woon Ha, Do-Hoon Hwang, Bumjoon J. Kim, "Elucidating Roles of Polymer Donor Aggregation in All-Polymer and Non-Fullerene Small-Molecule-Polymer Solar Cells", <i>Chem. Mater.</i> , <b>2020</b> , 32, 3585.
26	Seungjin Lee, Youngwoong Kim, Ziang Wu, <b>Changyeon Lee</b> , Seung Jin Oh, Nguyen Thanh Luan, Junbok Lee, Dahyun Jeong, Kai Zhang, Fei Huang, Taek-Soo Kim, Han Young Woo, Bumjoon J. Kim, "Aqueous-Soluble Naphthalene Diimide-Based Polymer Acceptors for Efficient and Air-

	Stable All-Polymer Solar Cells”, <i>ACS Appl. Mater. Interfaces</i> , <b>2019</b> , <i>11</i> , 45038.
25	Yuxiang Li, Minseok Kim, Ziang Wu, <b>Changyeon Lee</b> , Young Woong Lee, Jin-Woo Lee, Young Jun Lee, Ergang Wang, Bumjoon J. Kim, and Han Young Woo, “Influence of Backbone Modification of Difluoroquinoxaline-based Copolymers on the Interchain Packing, Blend Morphology and Photovoltaic Properties in Nonfullerene Organic Solar Cells”, <i>J. Mater. Chem. C</i> , <b>2019</b> , <i>7</i> , 1681.
24	Sang Woo Kim, Honggi Kim, Jin-Woo Lee, <b>Changyeon Lee</b> , Bogyu Lim, Jaechol Lee, Youngu Lee and Bumjoon J. Kim, “Synergistic Effects of Terpolymer Regioregularity on the Performance of All-Polymer Solar Cells”, <i>Macromolecules</i> , <b>2019</b> , <i>52</i> , 738.
23	Yuxiang Li, Jin-Woo Lee, Minseok Kim, <b>Changyeon Lee</b> , Young Woong Lee, Bumjoon J. Kim and Han Young Woo, “Regioisomeric Wide-Band-Gap Polymers with Different Fluorine Topologies for Non-Fullerene Organic Solar Cells”, <i>Polym. Chem.</i> , <b>2019</b> , <i>10</i> , 395.
22	Wansun Kim, Joonhyeong Choi, Jae-Han Kim, Taesu Kim, <b>Changyeon Lee</b> , Seungjin Lee, Mingoo Kim, Bumjoon J. Kim and Taek-Soo Kim, “Comparative Study of the Mechanical Properties of All-Polymer and Fullerene-Polymer Solar Cells: The Importance of Polymer Acceptors for High Fracture Resistance”, <i>Chem. Mater.</i> , <b>2018</b> , <i>30</i> , 2102.
21	Hoseon You, Donguk Kim, Han-Hee Cho, <b>Changyeon Lee</b> , Sanggyu Chong, Nam Young Ahn, Myungeun Seo, Jihan Kim, Felix Sunjoo Kim, and Bumjoon J. Kim, “Shift of the Branching Point of Side Chain in NDI-Based Polymer for Enhanced Electron Mobility and All-PSC Performance”, <i>Adv. Funct. Mater.</i> , <b>2018</b> , 1803613.
20	Youngkwon Kim, Joonhyeong Choi, <b>Changyeon Lee</b> , Youngwoong Kim, Changkyun Kim, Thanh Luan Nguyen, Bhoj Gautam, Kenan Gundogdu, Han Young Woo, and Bumjoon J. Kim*, “Aqueous Solution Fullerene Acceptors for Efficient Eco-Friendly Polymer Solar Cells Processed from Benign Ethanol/Water Mixtures”, <i>Chem. Mater.</i> , <b>2018</b> , <i>30</i> , 5663.
19	Kakaraparthi Kranthiraja, Um Kanta Aryal, Vijaya Gopalan Sree, Kumarsamay Gunasekar, <b>Changyeon Lee</b> , Minseok Kim, Bumjoon J. Kim, Myungkwan Song, and Sung-Ho Jin, “An Efficient Approach for Improving the Performance of Non-Halogenated Green Solvent Processed Polymer Solar Cells via Ternary-Blend Strategy”, <i>ACS Appl. Mater. Interfaces</i> , <b>2018</b> , <i>10</i> , 13748.
18	Wonho Lee, Jae-Han Kim, Taesu Kim, Sunha Kim, <b>Changyeon Lee</b> , Jin-Seong Kim, Hyungju Ahn, Taek-Soo Kim, and Bumjoon J. Kim, “Mechanically-Robust and High-Performance Ternary Solar Cells Combining the Merits of All-Polymer and Fullerene Blends”, <i>J. Mater. Chem. A.</i> , <b>2018</b> , <i>6</i> , 4494.
17	Wonho Lee, Seonju Jeong, <b>Changyeon Lee</b> , Gibok Han, Changsoon Cho, Jung-Yong Lee,

	Bumjoon J. Kim, "Self-Organization of Polymer Additive, Poly(2-vinylpyridine) via One-Step Solution Process to Enhance the Efficiency and Stability of Polymer Solar Cells", <i>Adv. Energy Mater.</i> , <b>2017</b> , 7, 1602812.
16	Sang Woo Kim, Joonhyeong Choi, Thi Thu Trang Bui, <b>Changyeon Lee</b> , Changsoon Cho, Kwangmin Na, Jihye Jung, Chang Eun Song, Biwu Ma, Jung-Yong Lee, Won Suk Shin, Bumjoon J. Kim, "Rationally Designed Donor-Acceptor Random Copolymers with Optimized Complementary Light Absorption for Highly Efficient All-Polymer Solar Cells, <i>Adv. Funct. Mater.</i> , <b>2017</b> , 27, 1703070.
15	Kakaraparthi Kranthiraja, Seonha Kim, <b>Changyeon Lee</b> , Kumarasamy Gunasekar, Vijaya Gopalan Sree, Bhoj Gautam, Kenan Gundogdu, Sung-Ho Jin, Bumjoon J. Kim, "The Impact of Sequential Fluorination of $\pi$ -Conjugated Polymers on Charge Generation in All-Polymer Solar Cells, <i>Adv. Funct. Mater.</i> , <b>2017</b> , 27, 1701256.
14	Han-Hee Cho, Gibok Han, Robert Younts, Wonho Lee, Bhoj R. Gautam, Seungjin Lee, <b>Changyeon Lee</b> , Taesu Kim, Felix Sunjoo Kim, Kenan Gundogdu, and Bumjoon J. Kim, "Impact of Highly-Crystalline, Isoindigo-Based Small-Molecular Additives for Enhancing Performance of All-Polymer Solar Cells", <i>J. Mater. Chem. A.</i> , <b>2017</b> , 5, 21291.
13	Han-Hee Cho, Taesu Kim, Kimyung Kim, <b>Changyeon Lee</b> , Felix Sunjoo Kim, and Bumjoon J. Kim, "Synthesis and Side-Chain Engineering of Phenylnaphthalenediimide (PNDI)-Based n-Type Polymers for Efficient All-Polymer Solar Cells, <i>J. Mater. Chem. A.</i> , <b>2017</b> , 5, 5449.
12	Hyunbum Kang, Wonho Lee, Jiho Oh, Taesu Kim, <b>Changyeon Lee</b> and Bumjoon J. Kim, "From Fullerene-Polymer to All-Polymer Solar Cells: The Importance of Molecular Packing, Orientation and Morphology Control", <i>Acc. Chem. Res.</i> , <b>2016</b> , 49, 2424.
11	Jiho Oh, Kakaraparthi Kranthiraja, <b>Changyeon Lee</b> , Kumarasamy Gunasekar, Seonha Kim, Biwu Ma, Bumjoon J. Kim, Sung-Ho Jin, "Side-Chain Fluorination: An Effective Approach to Achieving High-Performance All-Polymer Solar Cells with Efficiency Exceeding 7%", <i>Adv. Mater.</i> , <b>2016</b> , 28, 10016.
10	Jihye Jung, Wonho Lee, <b>Changyeon Lee</b> , Hyungju Ahn, Bumjoon J. Kim, "Controlling Molecular Orientation of Naphthalenediimide-Based Polymer Acceptors for Higher Performance All-Polymer Solar Cells", <i>Adv. Energy Mater.</i> , <b>2016</b> , 6, 1600504.
9	Wonho Lee, <b>Changyeon Lee</b> , Hojeong Yu, Dong-Jun Kim, Cheng Wang, Han Young Woo, Joon Hak Oh, Bumjoon J. Kim, "Side Chain Optimization of Naphthalenediimide-Bithiophene Based Polymers to Enhance the Electron Mobility and the Performance in All-Polymer Solar Cells", <i>Adv. Funct. Mater.</i> , <b>2016</b> , 26, 1543.
8	Changsoon Cho, Hyunbum Kang, Se-Woong Baek, Taesu Kim, <b>Changyeon Lee</b> , Bumjoon J Kim,

	Jung-Yong Lee, "Improved Internal Quantum Efficiency and Light-Extraction Efficiency of Organic Light-Emitting Diodes via Synergistic Doping with Au and Ag Nanoparticles", <i>ACS Appl. Mater. Interfaces</i> , <b>2016</b> , 8, 27911.
7	Hyunbum Kang, Mohammad Afsar Uddin, <b>Changyeon Lee</b> , Ki-Hyun Kim, Thanh Luan Nguyen, Wonho Lee, Yuxiang Li, Cheng Wang, Han Young Woo, Bumjoon J. Kim, "Determining the Role of Polymer Molecular Weight for High-Performance All-Polymer Solar Cells: Its Effect on Polymer Aggregation and Phase Separation", <i>J. Am. Chem. Soc.</i> , <b>2015</b> , 137, 2359.
6	Taesu Kim, Jae-Han Kim, Tae Eui Kang, <b>Changyeon Lee</b> , Hyunbum Kang, Minkwan Shin, Cheng Wang, Biwu Ma, Unyong Jeong, Taek-Soo Kim, Bumjoon J. Kim, "Flexible, highly efficient all-polymer solar cells", <i>Nat. Commun.</i> , <b>2015</b> , 6, 8547.
5	Bhoj R. Gautam, <b>Changyeon Lee</b> , Robert Younts, Wonho Lee, Evgeny Danilov, Bumjoon J. Kim, Kenan Gundogdu, "Charge Generation Dynamics in Efficient All-Polymer Solar Cells: Influence of Polymer Packing and Morphology", <i>ACS Appl. Mater. Interfaces</i> , <b>2015</b> , 7, 27586.
4	Joonhyeong Choi, Ki-Hyun Kim, Hojeng Yu, <b>Changyeon Lee</b> , Hyunbum Kang, Inho Song, Youngwoong Kim, Joon Hak Oh, Bumjoon J. Kim, "Importance of Electron Transport Ability in Naphthalene Diimide-Based Polymer Acceptors for High-Performance, Additive-Free, All-Polymer Solar Cells", <i>Chem. Mater.</i> , <b>2015</b> , 27, 5230.
3	Junwoo Park, <b>Changyeon Lee</b> , Jihye Jung, Hyunbum Kang, Ki-Hyun Kim, Biwu Ma, Bumjoon J. Kim, "Facile Photo-Crosslinking of Azide-Containing Hole-Transporting Polymers for Highly Efficient, Solution-Processed, Multilayer Organic Light Emitting Devices", <i>Adv. Funct. Mater.</i> , <b>2014</b> , 24, 7588.
2	Hyunbum Kang, Ki-Hyun Kim, Joonhyeong Choi, <b>Changyeon Lee</b> , Bumjoon J. Kim, "High-Performance All-Polymer Solar Cells Based on Face-on Stacked Polymer Blends with Low Interfacial Tension", <i>ACS Macro Lett.</i> , <b>2014</b> , 3, 1009.
1	Taesu Kim, Hyunbum Kang, Seonju Jeong, Dong Jin Kang, <b>Changyeon Lee</b> , Chun-Ho Lee, Min-Kyo Seo, Jung-Yong Lee, Bumjoon J. Kim, "Au@Polymer Core-Shell Nanoparticles for Simultaneously Enhancing Efficiency and Ambient Stability of Organic Optoelectronic Devices", <i>ACS Appl. Mater. Interfaces</i> , <b>2014</b> , 6, 16956.

## Patents

### International (United States)

1	Bumjoon Kim, Jae Kook Ha, Junwoo Park, <b>Changyeon Lee</b> , "Compound for Hole-Transport and Organic Light-Emitting Device Using the Same" ( <b>Registration number: US 9472770</b> ) ( <b>2016</b> )
---	---

## Domestic

6	Bumjoon Kim, Han Young Woo, Youngkwon Kim, Joonhyeong Choi, <b>Changyeon Lee</b> , Seungjin Lee, "New Compounds For Eco-friendly Organic Electronic Device, Composition and Eco-friendly Organic Electronic Device" (Application number: 10-2018-0163557)
5	Bumjoon Kim, <b>Changyeon Lee</b> , "All-Polymer Solar Cells Including NDI-thiophene Based Copolymer Acceptor with Side Chain and Manufacturing Method Thereof" ( <b>Registration number: 10-1739287-0000</b> ) (2017).
4	Bumjoon Kim, <b>Changyeon Lee</b> , "Producing method of electron donor polymer of triblock random copolymer" ( <b>Registration number: 10-1829739-0000</b> ) (2016).
3	Han Young Woo, Bumjoon Kim, Thanh Luan Nguyen, <b>Changyeon Lee</b> , "Ethanol-Soluble, Highly-Crystalline Conjugated Polymers and Fullerene Derivatives for High-Performance Polymer Solar Cells Using the Same" (Application number: 10-2016-0073062).
2	Bumjoon Kim, Wonho Lee, Jihye Jung, <b>Changyeon Lee</b> , "High-Performance All-Polymer Solar Cells via Optimization of Side Chain Length and Molecular Weight of n-type Polymer" (Application number: 10-2017-0172045).
1	Bumjoon Kim, Jae Kook Ha, Junwoo Park, <b>Changyeon Lee</b> , "Compound for Hole-Transport and Organic Light-Emitting Device Utilizing Same" (Application number: 10-2014-0142766).



## Presentation

### International Conference

13	"Aqueous Solution Processed Organic Solar Cells and Transistors", <i>The 7<sup>th</sup> Pacific Rim Conference on Rheology (PRCR)</i> , <b>Oral Presentation</b> , Republic of Korea (06/2018).
12	"An Critical Role of 2D Conjugated Side Chains of Benzodithiophene-Based Polymers in Engineering the Polymer Packing, Interfacial Ordering and Composition Variations of All-Polymer Solar Cells", <i>Global Photovoltaic Conference 2018</i> , Poster Presentation, Republic of Korea (03/2018).
11	"Design of Ethanol/Water-Processable Highly-Crystalline Conjugated Polymers and Fullerene Derivatives for Eco-Friendly Fabrication of Organic Transistors and Solar Cells", <i>Materials Research Society (MRS) 2017 Fall Meeting</i> , Poster Presentation, USA (11/2017)
10	"Ethanol-Processable p- and n-type Organic Semiconductors for Eco-Friendly Fabrication of Organic Field-Effect Transistors and Solar Cells", <i>The 9<sup>th</sup> Asian Conference on Organic Electronics (A-COE2017)</i> , Poster Presentation, Republic of Korea (10/2017)
9	"Design of Ethanol/Water-Processable Highly-Crystalline Conjugated Polymers and Fullerene Derivatives for Eco-Friendly Fabrication of Organic Transistors and Solar Cells", <i>KJF-ICOMEF 2017</i> , <b>Oral Presentation</b> , Republic of Korea (09/2017)
8	"Interplay between Processing Solvents, Phase-Separated Domain Sizes of Active Layers and Photovoltaic Performances in All-Polymer Solar Cells", <i>Materials Research Society (MRS) 2016 Fall Meeting</i> , Poster Presentation, USA (11/2016)
7	"Relationship between Phase-Separated Domain Sizes of Active Layer and Photovoltaic Parameters in All-Polymer Solar Cells", <i>The International Conference on Science and Technology of Synthetic Metals (ICSM) 2016</i> , Poster Presentation, China (06/2016) - <b>Best Poster Award</b>
6	"The Effect of Phase-Separated Domain Spacings of Active Layer on the Photovoltaic Properties in All-Polymer Solar Cells", <i>Global Photovoltaic Conference (GPVC) 2016</i> , <b>Oral Presentation</b> , Republic of Korea (04/2016) - <b>Best Oral Presentation Award</b>
5	"Determining the Role of Polymer Molecular Weight for High-Performance All-Polymer Solar Cells: Its Effect on Polymer Aggregation and Phase Separation", <i>Photovoltaic Science and Engineering Conference (PVSEC-25)</i> , <i>Global Photovoltaic Conference (GPVC) 2015</i> , Poster Presentation, Republic of Korea (11/2015)
4	"High-Performing All-Polymer Solar Cells with 5.96% Efficiency via Side Alkyl Chain Engineering of Naphthalenediimide-Based Polymer Acceptor", <i>Materials Research Society (MRS) 2015 Spring Meeting</i> , <b>Oral Presentation</b> , USA (04/2015)
3	"Side Chain Engineering of Naphthalenediimide-Based n-type Polymer for High-Performance All-

	Polymer Solar Cell near 6% Efficiency”, <i>American Physical Society (APS) 2015 Spring Meeting</i> , Poster Presentation, USA (03/2015)
2	“Side Chain Engineering of Naphthalenediimide-Based N-type Polymer for High-Performance All-Polymer Solar Cells with Efficiency near 6%”, <i>Korea-Japan Top University League Workshop on Photovoltaics (Top-PV2014)</i> , <b>Oral Presentation</b> , Japan (11/2014)
1	“Simultaneously Enhancing Light Extraction and Device Stability of Organic Light Emitting Diodes by Corrugated Polymer Nanosphere Templated PEDOT:PSS Layer”, <i>Materials Research Society (MRS) 2014 Spring Meeting</i> , <b>Oral Presentation</b> , USA (04/2014)

## Conference (Domestic)

10	“Design of 2D Conjugated Side Chains for Engineering the Polymer Packing, Interfacial Ordering and Composition Variations of All-Polymer Solar Cells”, <i>The Polymer Society of Korea Spring Meeting</i> , Poster Presentation (04/2018).
9	“An Important Role of 2D Conjugated Side Chains of Benzodithiophene-Based Polymers in Optimizing the Polymer Packing, Interfacial Ordering and Composition Variations of All-Polymer Solar Cells”, <i>Korea Photovoltaic Society</i> , Poster Presentation (11/2017).
8	“Simultaneous Enhancement of the Efficiency and Stability of Polymer Solar Cells: Self-Organization of Polymer Additive, Poly(2-vinylpyridine) via One-Step Solution Process”, <i>The Polymer Society of Korea Spring Meeting</i> , Poster Presentation (04/2017).
7	“Study on Phase-Separated Domain Spacings of Active Layer and Photovoltaic Performances Correlation in All-Polymer Solar Cells”, <i>Korea Polymer Society Fall Meeting</i> , Poster Presentation (04/2016)
6	“Side Chain Engineering of Polymer Acceptors: Highly Efficient Approach to Achieve High-Performance All-Polymer Solar Cells”, <i>The Polymer Society of Korea Fall Meeting</i> , Poster Presentation (11/2015)
5	“Determining the Role of Polymer Molecular Weight for High-Performance All-Polymer Solar Cells: Its Effect on Polymer Aggregation and Phase Separation”, <i>Korea Photovoltaic Society</i> , Poster Presentation (04/2015),
4	“High Performance All-Polymer Solar Cell Approaching 6% Efficiency via Side Chain Engineering of Polymer Acceptor”, <i>Korea Photovoltaic Society</i> , <b>Oral Presentation</b> (04/2015),
3	“High-Performance All-Polymer Solar Cells via Side Chain Engineering of Polymer Acceptor: Importance of Polymer Packing Structure and Nanoscale Blend Morphology”, <i>The Polymer Society of Korea Spring Meeting</i> , Poster Presentation (04/2015)

3	<p>"Simultaneously Enhancing Light Extraction and Device Stability of Organic Light-Emitting Diodes by Corrugated Polymer Nanosphere Templated PEDOT:PSS Layer", <i>Korea Polymer Society Spring Meeting, Poster Presentation</i> (04/2014)</p>
2	<p>"Simultaneously Enhancing Light Extraction and Device Stability of Organic Light Emitting Diodes by Corrugated Polymer Nanosphere Templated PEDOT:PSS Layer", <i>Korea Polymer Society Fall Meeting, <b>Oral Presentation</b></i> (10/2013).</p>
1	<p>"Newly Designed Hole-Injection Layer using Polymeric Nanospheres/PEDOT:PSS Continuous Phase Films for Highly Air Stable OLEDs", <i>Korea Polymer Society Spring Meeting, Poster Presentation</i> (04/2013).</p>

## Academic Referees

---

Name: Professor Dr. Chinedum Osuji  
Institution: Department of Chemical and Biomolecular Engineering, University of Pennsylvania, Philadelphia, United States of America  
Telephone: +1-215-573-3608  
E-mail: [cosuji@seas.upenn.edu](mailto:cosuji@seas.upenn.edu)

Name: Professor Dr. Bumjoon J. Kim  
Institution: Department of Chemical and Biomolecular Engineering, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Republic of Korea  
Telephone: +82-42-350-3935 (Tel)  
E-mail: [bjkim02@kaist.ac.kr](mailto:bjkim02@kaist.ac.kr)

Name: Professor Dr. Han Young Woo  
Institution: Department of Chemistry, Korea University, Seoul, Republic of Korea  
Telephone: +82-2-3290-3125 (Tel), +82-2-3290-3121 (Fax)  
E-mail: [hywoo@korea.ac.kr](mailto:hywoo@korea.ac.kr)

Name: Dr. Cheng Wang  
Institution: Advanced Light Source @ Lawrence National Berkeley Laboratory  
Telephone:  
E-mail: [cwang2@lbl.gov](mailto:cwang2@lbl.gov)