Jae Jin Bang
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Objective: Position as a Surface Analytical Scientist and Materials Chemist

Education

Aug 2013 – Dec 2018 **PhD in Chemistry**, Purdue University, West Lafayette, IN, USA
Mar 2009 – Aug 2013 **B.S. in Biological Sciences & Chemistry**, Seoul National University, Seoul, South Korea

Research Experience

Nov 2019 – present ***Senior Materials Characterization Engineer,*** *Sakti3. Inc./Dyson*
Design experiments and customized instrumental setup to perform **full-scale analysis on solid-state batteries and thin film materials** to improve our understanding of battery performance. **Manages and operates tools** in the **characterization** facility.

Jan 2019 – Oct 2019 ***Postdoctoral research associate*****,** Advisor: Prof. Ralph Nuzzo (University of Illinois, Urbana-Champaign)
Investigated carrier dynamics within mesoscale devices using electron microscopic techniques and scanning probe-based protocols

Aug 2013 – Dec 2018 ***Graduate research assistant*****,** Advisor: Prof. Shelley Claridge (Purdue University)
Established the group's protocols for scanning probe characterization of interfacial nanostructures. **Introduced sitting phase assembly** of photopolymerizable phospholipids as an alternative lithographic technique to construct sub-10 nm chemical patterns on layered materials. **Developed strategies to template the deposition of functional materials** including ultrathin nanowires and polymers on 2D surfaces using the amphiphilic chemical patterns.

Aug 2011 – Apr 2012 ***Undergraduate research assistant*****,** Advisor: Prof. Taek Dong Chung, (Seoul National University, Korea)
Investigated the size-selective catalytic properties of nanoporous electrodes to improve the efficiency of fuel cells.

Skills

Extensive knowledge in **noncovalent functionalization** of 2D materials and dynamics of **interfacial and bulk self-assembly**
Materials characterization*:* SEM, TEM, EDS, electron diffraction, STEM, XPS, XRD, Raman spectroscopy, contact angle measurements, TRPL, Brewster angle microscopy, STM, AFM (modalities including conductive AFM, KPFM, and force curves),
Surface functionalization*:* Langmuir-Blodgett/Schaefer transfer, drop-cast, spin-coating, microcontact printing, nanoelectrospray
Micro/Nanofabrication techniques: photolithography, electron beam lithography, wet/dry etching, physical vapor deposition, wire bonding, PECVD, FIB lithography
Data Analysis*:* MATLAB

Leadership Experience

July 2019 – Oct 2020 ***Secretary of Chemistry Joint Safety Team***, UIUC
Took meeting minutes and attendance. **Organized departmental activities** to promote safe culture

Aug 2016 – May 2017 ***Co-chair for Analytical Chemistry Seminar***, Purdue University
Chaired student led seminars. **Provided guidance for students** presenting at the seminars.

2013-2018 ***AFM and STM lead for the Claridge group*****,** Purdue University
Developed protocols for characterization of 2D supramolecular structures and t**rained** new users. **Installed** the instruments in lab. **Troubleshot** instrumental issues.

Honors/Awards

Apr 2017 The Chemistry Safety Award, Purdue University
Mar 2017 Phi Lambda Upsilon (PLU) travel grant, Purdue University
Feb 2017 Purdue Graduate Student Government Travel Grant, Purdue University
2011 – 2012 On-Dream-School Scholarship, Hyundai Motor Chung Mong-Koo Foundation, Seoul National University

Teaching Experience

Apr 2014	Graduate Teacher Certificate, Purdue Teaching Academy
Aug 2013 – May 2014	***Graduate teaching assistant*** in General Chemistry (CHM 115) Taught recitations and laboratory sections. Graded quizzes, held office hours; Received **"Exceptional" (top 30 %) performance rating**

Publications (* equal contributions)

1. **Jae Jin Bang**, Ashlin G. Porter, Tyson C. Davis, Tyler R. Hayes, 'Spatially controlled noncovalent functionalization of 2D materials based on molecular architecture,' *Langmuir,* 2018.
2. Shane R. Russell, Tyson C. Davis, **Jae Jin Bang**, and Shelley A. Claridge, 'Spectroscopic metrics for alkyl chain ordering in lying-down noncovalent monolayers of diynoic acids on graphene,' *Chem. Mater*, 2018.
3. Tyson C. Davis*, **Jae Jin Bang***, Jacob T. Brooks, David G. McMillan, and Shelley A. Claridge, 'Hierarchically patterned noncovalent functionalization of 2D materials by controlled Langmuir-Schaefer Conversion,' *Langmuir,* 2018.
4. Tyler R. Hayes, **Jae Jin Bang**, Tyson C. Davis, Caroline F. Peterson, David G. McMillan, Shelley A. Claridge, 'Multimicrometer noncovalent monolayer domains on layered materials through thermally controlled Langmuir-Schaefer conversion,' *ACS Appl. Mater. Interfaces*, 2017.
5. Terry Villarreal, Shane R. Russell, **Jae Jin Bang**, Justin Patterson, Shelley Claridge, 'Modulating wettability of layered materials by controlling ligand polar headgroup dynamics,' *J. Am. Chem. Soc.*, 2017.
6. Shi Wah Choong, Shane R. Russell, **Jae Jin Bang**, Justin K. Patterson, Shelley A. Claridge, 'Sitting phase monolayers of polymerizable phospholipids create dimensional, molecular-scale wetting control for scalable solution-based patterning of layered materials,' *ACS Appl. Mater. Interfaces*, 2017.
7. **Jae Jin Bang***, Kortney K. Rupp*, Shane R. Russell, Shi Wah Choong, and Shelley A. Claridge, 'Sitting phases of polymerizable amphiphiles for controlled functionalization of layered materials,' *J. Am. Chem. Soc.*, 2016. **Featured in JACS Spotlight. Selected for 2017 JACS Young Investigator Virtual Issue.**
8. **Jae Jin Bang**, Shane. R. Russell, Kortney K. Rupp, and Shelley A. Claridge, 'Multimodal scanning probe imaging: nanoscale chemical analysis from biology to renewable energy,' *Anal. Methods*, 2015.

Patents

1. Claridge, S. A.; Choong S. W.; **Bang, J. J.**; Russell S. R. 2018. 'Methods of nanoscale directional wetting uses thereof.' U.S. Utility Patent 15/875,025, filed 19 January 2018.
2. Claridge S. A.; Villarreal, T. V.; **Bang J. J.**; Russell, S. R. 2017. 'Modulating interfacial wettability of a noncovalent nanoscopic ligand film.' U.S. Provisional Patent 62/564,325, filed 28 Sept 2017.

Presentations

1. **Jae Jin Bang**, 'Tailoring 5-10 nm Chemically Orthogonal Surface Patterns on Layered Materials Using Sitting Phases of Polymerizable Amphiphiles'. Oral presentation at Phi Lamda Upsilon Distinguished Researcher Seminar, West Lafayette, In, 2017.
2. **Jae Jin Bang,** Kortney K. Rupp, Shane R. Russell, Shi Wah Choong, Tyson C. Davis, Tyler R. Hayes, Jacob T. Brooks, and Shelley A. Claridge, 'Understanding the Langmuir-Schaefer transfer for controlled assembly of amphiphiles on layered materials for noncovalent surface patterning'. Poster presentation at The 2017 Notre Dame-Purdue Symposium on Soft Matter & Polymers, West Lafayette, IN, 2017
3. **Jae Jin Bang**, Kortney K. Rupp, Shane R. Russell, Shi Wah Choong, Tyson C. Davis, Jacob T. Brooks, Shelley A. Claridge, 'Tunable chemical patterns at sub-10 nm scale – sitting phase assembly of photopolymerizable phospholipids on layered materials'. Poster presentation at 32nd ISP National Triennial Convention, Indianapolis, IN, 2017.
4. **Jae Jin Bang**, Kortney K. Rupp, Shane R. Russell, Shi Wah Choong, Tyson C. Davis, Tyler R. Hayes, Ashlin Porter, Jacob T. Brooks, and Shelley A. Claridge, 'Tailoring 5-10 nm chemically orthogonal surface patterns on layered materials using sitting phases of polymerizable amphiphiles'. Oral presentation at 253rd ACS National Meeting & Exposition, San Francisco, CA, 2017.
5. **Jae Jin Bang,** Kortney K. Rupp, Shane R. Russell, Shi Wah Choong, Tyson C. Davis, Tyler R. Hayes, Jacob T. Brooks, and Shelley A. Claridge, 'Tailoring surface chemistry of layered materials through self-assembled monolayer of polymerizable amphiphiles'. Poster presentation at The 2016 Notre Dame-Purdue Symposium on Soft Matter & Polymers, South Bend, IN, 2016.
6. **Jae Jin Bang**, Kortney K. Rupp, Shane R. Russell, Shi Wah Choong, Tyson C. Davis, Tyler R. Hayes, Jacob T. Brooks, and Shelley A. Claridge, 'Sitting phases of polymerizable amphiphiles provide tunable orthogonal surface chemistry via non-covalent functionalization for layered materials'. Poster presentation at 2016 H. C. Brown Lectures, West Lafayette, IN, 2016.