

## Myung-Gil Kim

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### Education

2006.09 – 2012.02 Northwestern University, Evanston, IL

Ph.D. in Chemistry

Joint Advisors: Prof. Tobin J. Marks and Prof. Mercuri G. Kanatzidis

1999.03 – 2006.08 Korea Advanced Institute of Science and Technology

(KAIST) B.S. Chemistry (Major) and Applied Mathematics (Minor)

### Research Experience

2014.03 ~ present *Chung-Ang University Assistant Professor*

- Research on advanced electronic material, soluble inorganic material precursor, energy material.

2013.01 – 2014.02 *Stanford University Postdoctoral Fellow (Advisor: Prof. Zhenan Bao)*

- Developed stable and strong charge transfer doping of carbon materials (CNT/Graphene) and polymer semiconductor with oxide semiconductors.

2012.03 - 2012.12 *Northwestern University Postdoctoral Fellow (Advisor: Prof. Tobin J. Marks)*

- Developed novel metal oxide semiconductor based interfacial layer for organic photovoltaics.

2006.09-2012.02 *Northwestern University Graduate Research Assistant*

**(Joint Advisors: Prof. Tobin J. Marks and Prof. Mercuri G. Kanatzidis)**

**Ph. D. Thesis: Solution-processed Post Transition Metal Oxide Semiconductor Electronics: High Performance Thin-film Transistor and/or Low Temperature Processed Thin Film**

- Synthesized solution processed high electron mobility amorphous oxide semiconductors.
- Developed novel low temperature solution processing strategy for metal oxide thin-film based electronics from combustion chemistry.
- Developed post linkage concept for nano-material based macroelectronics application

## Publication

38. Low Temperature Post-Functionalization of Highly Conductive Oxide Thin-Films Toward Solution-Based Large-Scale Electronics

Seok-Gyu Ban, Kyung-Tae Kim, Byung Doo Choi, Jeong-Wan Jo, Yong-Hoon Kim, Antonio Facchetti, Myung-Gil Kim\*, Sung Kyu Park\* \* *ACS Appl. Mater. Interfaces* **2017**, *Accepted*

37. Cooperative behavior of perfluoro carboxylic acid on cyclohexane oxidation catalyzed by  $\mu$ -nitrido diiron phthalocyanine complex

Kyeongjun Seo, Hyeongyeon Kim, Jaewon Lee, Myung-Gil Kim\*, SungYong Seo\*, Choongik Kim\* *J. Ind. Eng. Chem.* **2017**, *53*, 371

36. Thread-Like CMOS Logic Circuits Enabled by Reel-Processed Single-Walled Carbon Nanotube Transistors via Selective Doping

Jae Sang Heo, Taehoon Kim, Seok-Gyu Ban, Daesik Kim, Jun Ho Lee, Jesse S. Jur, Myung-Gil Kim, Yong-Hoon Kim\*, Yongtaek Hong\*, Sung Kyu Park\* *Adv. Mater.* **2017**, *Accepted*

35. Coplanar D- $\pi$ -A organic sensitizers featuring a thienylethynyl spacer for efficient dye-sensitized solar cells

Kwang-Won Park, Sungwoo Ahn, Myung Hoon Baek, Dong-Suk Lim, Alan A. Wiles, Myung Gil Kim\*, Jongin Hong\* *Mater. Express* **2017**, *7*, 43

34. Multifunctional Organic-Semiconductor Interfacial Layers for Solution-Processed OxideSemiconductor Thin-Film Transistor

Guhyun Kwon, Keetae Kim, Byung Doo Choi, Jeongkyun Roh, Changhee Lee, Yong-Young Noh, SungYong Seo, Myung-Gil Kim\*, Choongik Kim\* *Adv. Mater.* **2017**, *29*, 1607055

33. Chemical Vapor Deposited Hexagonal Boron Nitride as a Scalable Template for High-Performance Organic Field-Effect Transistors

Tae Hoon Lee, Kwanpyo Kim, Gwangwoo Kim, Hyo Ju Park, Declan Scullion, Leo Shaw, Myung-Gil Kim, Xiaodan Gu, Won-Gyu Bae, Elton Santos, Zonghoon Lee, Hyeon Suk Shin, Yoshio Nishi, Zhenan Bao *Chem. Mater.* **2017**, *29*, 2341

32. Low-Temperature Sol-Gel Derived Ultra-Flexible Metal-Oxide Thin-Film-Transistors and Their Applications

Jeong-Wan Jo, Jae Sang Heo, Kyung-Tae Kim, Jaehyun Kim, Myung-Gil Kim, Sung Kyu Park *ECS Transactions* **2016**, *75*, 123-126

31. Enhanced mass transfer rate of methane in aqueous phase via methyl-functionalized SBA-15

Jaewon Lee, Kwangmin Kim, In Seop Chang, Myung-Gil Kim, Kyoung-Su Ha, Eun Yeol Lee, Jinwon Lee, Choongik Kim *J. Mol. Liq.* **2016** *215*, 154-160

30. Investigation and prediction of the salting-out effect of methane in various aqueous electrolyte solutions

Kwangmin Kim, Kyeongjun Seo, Jaewon Lee, Myung-Gil Kim, Kyoung-Su Ha, Choongik Kim *J. Ind. Eng. Chem.* **2016** *34*, 117-121

29. Design, synthesis, and characterization of  $\alpha$ ,  $\omega$ -disubstituted indeno [1, 2-b] fluorene-6, 12-dionethiophene molecular semiconductors. Enhancement of ambipolar charge transport through synthetic tailoring of alkyl substituents  
Mehmet Ozdemir, Donghee Choi, Guhyun Kwon, Yunus Zorlu, Hyekyoung Kim, Myung-Gil Kim, SungYong Seo, Unal Sen, Murat Citir, Choongik Kim, Hakan Usta *RSC Advances* **2016** 6, 212-226
28. Water-Mediated Photochemical Treatments for the Low-Temperature Passivation of Metal-Oxide ThinFilm Transistors  
Jae Sang Heo, Jeong-Wan Jo, Jingu Kang, Chan-Yong Jeong, Hu Young Jeong, Sung Kyu Kim, Kwanpyo Kim, Hyuck-In Kwon, Jaekyun Kim, Yong-Hoon Kim, Myung-Gil Kim\*, Sung Kyu Park\* *ACS Appl. Mater. Interfaces* **2016**, 8, 10403-10412
27. Ultrahigh Detective Heterogeneous Photosensor Arrays with In-Pixel Signal Boosting Capability for Large-Area and Skin-Compatible Electronics  
Jaekyun Kim, Jaekyun Kim, Sangho Jo, Jingu Kang, Jeong-Wan Jo, Myungwon Lee, Juhyuk Moon, Lin Yang, Myung-Gil Kim, Yong-Hoon Kim,\* Sung Kyu Park\* *Adv. Mater.* **2016**, 28, 3078-3086
26. Enhancement of methane-water volumetric mass transfer coefficient by inhibiting bubble coalescence with electrolyte  
K. Kim, J. Lee, K. Seo, M.-G. Kim, K.-S. Ha, C. Kim *J. Ind. Eng. Chem.* **2016**, 33, 326-329
25. Mechanically Durable and Highly Stretchable Transistors Employing Carbon Nanotube Semiconductor and Electrodes  
A. Chortos, G. I. Koleilat, R. Pfattner, D. Kong, P. Kin, R. Nur, T. Lei, H. Wang, N. Liu, Y.-C. Lai, M.-G. Kim, J. W. Chung, S. Lee, Z. Bao *Adv. Mater.* **2016**, 28, 4441-4448
24. Controlled aqueous synthesis of ultra-long copper nanowires for stretchable transparent conducting electrode  
C. Hwang, J. An, B. D. Choi, K. Kim, S.-W. Jung, K.-J. Baeg, M.-G. Kim\*, K. M. Ok,\* J. Hong\* *J. Mater. Chem. C* **2016**, 4, 1441-1447
23. Scalable Sub-micron Patterning of Organic Materials Toward High Density Soft Electronics  
J. Kim,<sup>†</sup> M.-G. Kim,<sup>†</sup> J. Kim, S. Jo, J. Kang, J.-W. Jo, W. Lee, C. Hwang, J. Moon, L. Yang, Y.-H. Kim, Y.-Y. Noh, J. Y. Jaung, Y.-H. Kim, S. K. Park *Sci. Rep.* **2015** 5, 14520; doi: 10.1038/srep14520.  
(<sup>†</sup>: equally contributed to this manuscript)
22. Design, Synthesis, and Characterization of 0-D, 1-D, and 2-D Zinc–Adeninate Coordination Assemblies  
J. An, S. J. Geib, M.-G. Kim *Bull. Korean Chem. Soc.* **2015**, 36, 2135-2138.
21. Synthesis and characterization of a new anionic zinc-adeninate metal–organic framework,  $Zn_3(ad)(BTC)_2 \cdot (Me_2NH_2)_5 \cdot 7.5 DMF \cdot 0.25 H_2O$   
J. An, S. J. Geib, M.-G. Kim, S. Y. Choi, W. T. Lim *Porous Mater.* **2015**, 22, 867-875.
20. Amorphous oxide alloys as interfacial layers with broadly tunable electronic structures for organic photovoltaic cells  
N. Zhou,<sup>†</sup> M.-G. Kim,<sup>†</sup> S. Loser, J. Smith, H. Yoshida, X. Guo, C. Song, H. Jin, Z. Chen, S. M. Yoon, A.

J. Freeman, R. P. H. Chang, A. Facchetti, T. J. Marks, *Proc. Natl. Acad. Sci. USA* **2015**, *112*, 7897-7902  
(<sup>†</sup>: equally contributed to this manuscript)

19. Photochemically Activated Flexible Metal-Oxide Transistors and Circuits Using Low Impurity Aqueous System

J.-S. Heo, J.-H. Kim, J. Kim, M.-G. Kim, Y.-H. Kim, S. K. Park *IEEE Electron Device Lett.* **2015**, *36*, 162164

18. Highly Stable and Imperceptible Electronics Utilizing Photoactivated Heterogeneous Sol-Gel Metal-Oxide Dielectrics and Semiconductors

J.-W. Jo, J. Kim, K.-T. Kim, J.-G. Kang, M.-G. Kim, K.-H. Kim, H. Ko, Y.-H. Kim, S. K. Park *Adv. Mater.* **2015**, *27*, 634-640

17. Highly Skin-Conformal Microhairy Sensor for Pulse Signal Amplification

C. Pang, J. H. Koo, A. Nguyen, J. M. Caves, M.-G. Kim, A. Chortos, K. Kim, P. J. Wang, J. B.-H. Tok, Z. Bao *Adv. Mater.* **2015**, *27*, 634-640

16. Low-temperature annealed PbS quantum dot films for scalable and flexible ambipolar thin-filmtransistors and circuits

C. H. Jo, J. H. Kim, J. Kim, J. Kim, M. S. Oh, M. S. Kang, M.-G. Kim, Y.-H. Kim, B. K. Ju, S. K. Park *J. Mater. Chem. C* **2014**, *2*, 10305-10311

15. Selective metal deposition at graphene line defects by atomic layer deposition

K. Kim, H.-B.-R. Lee, R. W. Johnson, J. T. Tanskanen, N. Liu, M.-G. Kim, C. Pang, C. Ahn, S. F. Bent, Z. Bao *Nature Commun.* **2014**, *5*, 4781: doi:10.1038/ncomms5781

14. Synthesis and Characterization of Silver (I) Pyrazolylmethylpyridine Complexes and Their Implementation as Metallic Silver Thin Film Precursors

I. Bassanetti, C. P. Twist, M.-G. Kim, A. M. Seyam, H. S. Bazzi, Q. J. Wang, Y.-W. Chung, L. Marchiò, M. Delferro, T. J. Marks *Inorg. Chem.* **2014**, *53*, 4629-4638.

13. Gradual Controlling the Work Function of Metal Electrodes by Solution-Processed Mixed Interlayers for Ambipolar Polymer Field-Effect Transistors and Circuits

D. X. Long, K. J. Baeg, Y. Xu, S. J. Kang, M.-G. Kim, G. W. Lee, Y. Y. Noh *Adv. Func. Mater.* **2014**, *24*, 6484-6491.

12. Charge-Trap Flash-Memory Oxide Transistors Enabled by Copper-Zirconia Composites

K. J. Baeg, M.-G. Kim, C. K. Song, X. Yu, A. Facchetti, T. J. Marks *Adv. Mater.* **2014**, *26*, 7170-7177.

11. Oxygen “Getter” Effects on Microstructure and Carrier Transport in Low Temperature Combustion-Processed a-InXZnO (X = Ga, Sc, Y, La) Transistors

J. Hennek, S. Jeremy, A. Yan, M.-G. Kim, W. Zhao, V. P. Dravid, A. Facchetti, T. J. Marks *J. Am. Chem. Soc.* **2013**, *135*, 10729-10741.

10. Delayed Ignition of Autocatalytic Combustion Precursors: Low-Temperature Nanomaterial Binder Approach to Electronically Functional Oxide Films

M.-G. Kim, J. Hennek, H. S. Kim, M. G. Kanatzidis, A. Facchetti, T. J. Marks *J. Am. Chem. Soc.* **2012**, *134*, 11583-11593.

9. Exploratory Combustion Synthesis: Amorphous Indium Yttrium Oxide for Thin-Film Transistors  
J. Hennek,<sup>†</sup> M.-G. Kim,<sup>†</sup> M. G. Kanatzidis, A. Facchetti, T. J. Marks *J. Am. Chem. Soc.* **2012**, *134*, 9593-9596. (†: equally contributed to this manuscript)

8. Molecularly-Engineered Lubricants: Synthesis, Activation, and Tribological Characterization of Silver Complexes as Lubricant Additives  
C. P. Twist, A. M. Seyam, C. Chen, M.-G. Kim, M. P. Weberski Jr., N. Ren, T. J. Marks, Y.-W. Chung, Q. J. Wang *Adv. Eng. Mater.*, **2012**, *14*, 101-103.

7. Strongly nonlinear optical chalcogenide thin films of APSe<sub>6</sub> (A = K, Rb) from spin-coating  
I. Chung, M.-G. Kim, J. Jang, J. He, J. B. Ketterson, M. G. Kanatzidis, *Angew. Chem., Int. Ed.* **2011**, *50*, 10867-10870.

6. Thieno[3,4-c]pyrrole-4,6-Dione-Based Polymer Semiconductors: Towards High-Performance, AirStable Organic Thin-Film Transistors  
X. Guo, R. Ponce Ortiz, Y. Zheng, M.-G. Kim, S. Zhang, Y. Hu, G. Lu, A. Facchetti, T. J. Marks *J. Am. Chem. Soc.* **2011**, *133*, 13685-13697.

5. Low Temperature Fabrication of High-Performance Metal Oxide Thin-Film Electronics via Combustion Processing  
M.-G. Kim, M. G. Kanatzidis, A. Facchetti, T. J. Marks *Nature Mater.* **2011**, *10*, 382-388.

4. Flexible Low-Voltage Organic Thin-Film Transistors Enabled by Low-Temperature, Ambient Solution-Processable Inorganic/Organic Hybrid Gate Dielectrics  
Y.-G. Ha, S. Jeong, J. Wu, M.-G. Kim, V. P. Dravid, A. Facchetti, T. J. Marks *J. Am. Chem. Soc.* **2010**, *132*, 17426-17434.

3. High-Performance Solution-Processed Amorphous Zinc-Indium-Tin-Oxide Thin-Film Transistors M.-G. Kim, H. S. Kim, Y.-G. Ha, J. He, M. G. Kanatzidis, A. Facchetti, T. J. Marks *J. Am. Chem. Soc.* **2010**, *132*, 10352-10364.

2. The Tellurophosphate K<sub>4</sub>P<sub>8</sub>Te<sub>4</sub>: Phase-Change Properties, Exfoliation, Photoluminescence in Solution and Nanospheres  
I. Chung, J.-H. Song, M. G. Kim, C. D. Malliakas, A. L. Karst, A. J. Freeman, D. P. Weliky, M. G. Kanatzidis *J. Am. Chem. Soc.* **2009**, *131*, 16303-16312.

1. Low-Temperature Solution-Processed Amorphous Indium Tin Oxide Field-Effect Transistors  
H. S. Kim, M.-G. Kim, Y.-G. Ha, M. G. Kanatzidis, T. J. Marks, A. Facchetti *J. Am. Chem. Soc.* **2009**, *131*, 10826-10827.