

HEEYEOP CHAE

Affiliation	School of Chemical Engineering, Sungkyunkwan University (SKKU), Sungkyun Advanced Institute of Nanotechnology (SAINT), Sungkyunkwan University (SKKU)	
Address	2066, Seobu-ro, Suwon, 16419, Republic of Korea,	
Contact	Phone: +82-31-290-7342, Email: hchae@skku.edu , Homepage: https://npl.skku.edu	
Work Experience	Sungkyunkwan University (SKKU) Professor, Mar. 2004 – Present . Plasma monitoring and machine learning technology . Plasma atomic layer etching(ALE) and atomic layer deposition (ALD) . Replacing greenhouse gases with alternative molecules . Quantum dot(QD) and quantum dot light emitting diodes (QLED)	Suwon, Korea
	Applied Materials Inc. Senior Process Engineer, Mar. 2000- Feb. 2004 “Development of Low-k Dielectric Etch Process”, “Plasma sources development and characterization for dielectric etching”	Sunnyvale, CA, USA
	Advanced Industrial Science and Technology (AIST), . Visiting Scholar, Jul. 2010 – Sep. 2010., May, 2017 – Feb. 2018. . Plasma source and deposition technology	Tsukuba, Japan
	Korea Institute of Science and Technology (KIST) . Visiting Scholar, Mar, 2010 – June. 2010, Oct. 2010 – Feb. 2011. Organic solar cell at Solar Cell Research Center . Commissioned Assistant Researcher: Mar. 1993 - Jun. 1993, Development of a simulator for oxygen separation from air.	Seoul, Korea
Education	Massachusetts Institute of Technology (MIT) Sep. 1993- Feb. 2000, Ph. D. in Chemical Engineering Thesis: Plasma chemical kinetics of silicon dioxide etching with fluorocarbon compounds Advisor: Herbert H. Sawin Minor: Electronic Engineering	Cambridge, MA
	Seoul National University Mar. 1986 – Aug. 1992, M.S. in Chemical Engineering Thesis: "Development of expert system of hazard and operability studies" Background on process simulation, control, optimization, and artificial intelligence	Seoul, Korea
	Seoul National University Mar. 1986 – Feb. 1990, B.S. in Chemical Engineering, Magna Cum Laude Joined a computer study club. Had summer jobs in refinery and petrochemical companies as well as in a government supported research center.	Seoul, Korea
Awards	Research Award (2017), Korea Vacuum Society Best teaching award (2006, 2012), Sungkyunkwan University, College of Engineering, Korea Dorothy and Earl S. Hoffman Award (1999), American Vacuum Society	
Professional Communities	International Meeting on Information Display(IMID) Program Committee Member, since 2016 Associate Editor of Korean Journal of Chemical Engineering, 2014-2016 Organization Committee Member of International Conference of Microelectronics and Plasma-Technology (ICMAP), 2012, 2014, 2016, 2018 Operation Committee Member, Korean Institute of Chemical Engineering, 2011, 2017 Operation Committee Member, Korean Vacuum Society, 2015-2019	
Publications	More than 150 technical papers and 20 patents. (https://npl.skku.edu/npl/paper.do)	

Selected Publications (Corresponding authored papers) –

- Y. Kim, S. Chae, H. Ha, H. Lee, S. Lee, **H. Chae**, "Thermal Atomic Layer Etching of Cobalt using Plasma Chlorination and Chelation with Hexafluoroacetylacetone", *Appl. Surf. Sci.* 619, 156751 (2023)
- Y. Kim, S. Kim, H. Kang, S. You, C. Kim, **H. Chae**, "Low Global Warming C₄H₃F₇O Isomers for Plasma Etching of SiO₂ and Si₃N₄ Films", *ACS Sustain. Chem. Eng.* 10, 32, 10537 (2022)
- J. Li, S. Kim, S. Han, **H. Chae**, "Characterization of sp²/sp³ Hybridization Ratios of Hydrogenated Amorphous Carbon Films Deposited in C₂H₂ Inductively Coupled Plasmas", *Surf. Coat. Technol.* 422, 127514 (2021)
- J. Li, S. Kim, S. Han, Y. Kim, **H. Chae**, "Etching Characteristics of Hydrogenated Amorphous Carbon with Different sp²/sp³ Hybridization Ratios in CF₄/O₂ Plasmas", *Plasma. Process. Polym.* 18, 21, 2100075 (2021)
- H. Moon, **H. Chae**, "Efficiency Enhancement of All-Solution Processed Inverted Structure Green Quantum Dot Light-Emitting Diodes Via Partial Ligand Exchange with Thiophenol Derivatives Having Negative Dipole Moment", *Adv. Opt. Mater.*, 8, 1901314 (2020)
- H. Tran, W. Jiang, M. Lyu, **H. Chae**, "Tetrahydrofuran as Solvent for P3HT/F4-TCNQ Hole-Transporting Layer to Increase the Efficiency and Stability of FAPbI₃-Based Perovskite Solar Cell" *J. Phys. Chem. C*, 124, 26, 14099 (2020)
- H. Moon, C. Lee, W. Lee, J. Kim, **H. Chae**, "Stability of Quantum Dots, Quantum Dot Films, and Quantum Dot Light-Emitting Diodes for Display Applications", *Adv. Mater.*, 1804294 (2019)
- H. Jin, H. Moon, W. Lee, H. Hwangbo, S. H. Yong, H. K. Chung, **H. Chae**, "Charge balance control of quantum dot light emitting diodes with atomic layer deposited aluminum oxide interlayers", *RSC Adv.*, 9, 11634-11640 (2019)
- Y. Fu, W. Jiang, D. Kim, W. Lee, **H. Chae**, "Highly Efficient and Fully Solution-Processed Inverted Light-Emitting Diodes with Charge Control Interlayers", *ACS. Appl. Mater. Interfaces.*, 10, 17295 (2018)
- Y. Fu, D. Kim, H. Moon, H. Yang, **H. Chae**, "Hexamethyldisilazane-mediated, full-solution-processed inverted quantum dot-light-emitting diodes", *J. Mater. Chem. C.*, 5, 522-526, (2017)
- D. Kim, Y. Fu, S. Kim, W. Lee, K.H. Lee, H.K. Chung, H.J. Lee, H. Yang, **H. Chae**, "Polyethylenimine Ethoxylated-Mediated All-Solution-Processed High-Performance Flexible Inverted Quantum Dot-Light-Emitting Device", *ACS Nano*, 11, 1982-1990 (2017)
- K. Koh, Y. Kim, C. Kim, **H. Chae**, "Quasi atomic layer etching of SiO₂ using plasma fluorination for surface cleaning", *J. Vac. Sci. Technol. A*, 36 (1), 01B106-5 (2017)
- H. Jang, H. Lee, H. Lee, C.K. Kim, **H. Chae**, "Sensitivity Enhancement of Dielectric Plasma Etching Endpoint Detection by Optical Emission Spectra with Modified K-Means Cluster Analysis", *IEEE Trans. Semicond. Manuf.*, 20, 17-22 (2017)
- H.Y. Yang, Y. Fu, M.S. Jang, Y. Li, J.H. Lee, **H. Chae**, D.S. Lee, "Multifunctional Polymer ligand Interface CdZnSeS/ZnS Quantum Dot/Cy3-labeled Protein pairs as sensitive FRET sensors", *ACS Appl. Mater. Interfaces.*, 8(51), 35021-35032 (2016)
- W. Hwang, C. Pang, **H. Chae**, "Fabrication of aligned nanofibers by electric-field-controlled electrospinning: insulating-block method", *Nanotechnol.*, 27, 435301
- M. D. Ho, N. Kim, D. Kim, S. M. Cho, **H. Chae**, "CdSe/ZnS Quantum Dot Thin Film Formation by an Electrospray Deposition Process for Light-Emitting Devices", *Small*, 10, 4142 (2014)
- M. D. Ho, D. Kim, N. Kim, S. M. Cho, **H. Chae**, "Polymer and Small Molecule Mixture for Organic Hole Transport Layers in Quantum Dot Light-Emitting Diodes", *ACS. Appl. Mater. Interfaces.*, 5 (23), 12369 (2013)
- H. Jang, J. Nam, C.-K. Kim, **H. Chae**, "Real-Time Endpoint Detection of Small Exposed Area SiO₂ Films in Plasma Etching Using Plasma Impedance Monitoring with Modified Principal Component Analysis", *Plasma Process. Polym.*, 10, 850-856 (2013)