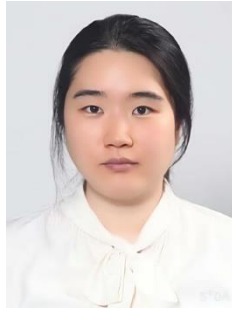


CURRICULUM VITAE



So-Yeon Lee

Assistant professor
Department of Materials Science and Engineering
Kumoh National Institute of Technology
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EDUCATION

2011. 3. ~2017. 8. **Seoul National University**
Seoul, Korea
Ph. D. in Materials Science and Engineering
Dissertation title: Electron Beam Induced Ductile Enhancement and Large Strain Plasticity of Cu Thin Films
Advisor: Young-Chang Joo, Professor
2011. 2. **Seoul National University**
Seoul, Korea
B. S. in Materials Science and Engineering

RESEARCH INTERESTS

- Deformation behavior and related microstructure change of metallic nanomaterials
- Investigation of microstructure of materials based on transmission electron microscope (TEM)
- Reliability of metal interconnects for semiconductors and advanced packaging

RESEARCH EXPERIENCES

2017. 10. ~ 2020.08 Post doctoral researcher at Department of Materials Science and Engineering
Seoul National University, Seoul, Korea
2020. 09 ~ Assistant Professor at Department of Materials Science and Engineering
Kumoh national institute of technology

Analysis on microstructure of materials for electronic devices

- Investigation of microstructure of materials by transmission electron microscopy (TEM); High resolution imaging, S/TEM, TEM-based EBSD (ASTAR™)
- Microstructure analysis of metallic materials; characteristics of grains and texture based on OIM Analysis™
- Fine TEM sampling of metal thin film on polymer substrate (mechanical polishing and precision ion polishing system (PIPS) ion milling)

Mechanical deformation of metal thin film on polymer substrate

- Design tensile/compressive test of material under in-situ condition using scanning electron microscopy (SEM) and optical microscopy
- Design bending fatigue test of thin film material under in-situ resistance monitoring

Fabrication of electronic devices with various methodologies

- Fabricate thin-film based electronic devices (thin-film transistor (TFT), organic light-emitting diode (OLED), a-C hardmask for 3D NAND flash) using physical vapor deposition
- Design alloying and annealing system for retarding sintering temperature of metal nanoparticle based on wet-based method and rapid thermal annealing
- Synthesizing nanoparticles with hydrolysis method and fabricate electrophoretic display

PUBLICATIONS

- Effect of Ag agglomeration-driven nanovoids formation on fatigue reliability of Cu-Ag alloy flexible interconnects, S. Lee, J.-M. Shin, J. H. Hyun, I.-S. Choi, Y.-C. Joo, B.-J. Kim* and **S.-Y. Lee***, *Journal of Materials Research and Technology* (2024)
- Bonding Structure and Dry Etching Characteristics in Amorphous B-C-N Films for Hardmask Applications, H. Kim, U.-G. Kim, D. Hong, S. Kim, S. Han, Y.-C. Joo* and **S.-Y. Lee***, *Carbon* (2024)
- Selective crack suppression during deformation in metal films on polymer substrates using electron beam irradiation, **S.-Y. Lee**, G. R. Park, S.-G. Kang, J.-H. Lee, E.-C. Jeon, C.-H. Shim, J.-P. Ahn, D.-I. Kim, H. N. Han, Y.-C. Joo*, C. Kim* and I.-S. Choi*, *Nature Communications*, 10 (2019)
- Anisotropic microstructural evolutions of extruded ZK60 Mg alloy subjected to electropulsing treatment, S. J. Oh, J. Yu, S. Cheon, S. H. Lee, **S.-Y. Lee** and T. Lee*, *Journal of Materials Research and Technology* (2023)
- Boron-doped amorphous carbon deposited by DC sputtering for a hardmask: Microstructure and dry etching properties, S. Kim, U. Kim, J. Ryu, D.-k. Kim, M. Kim, Y.-C. Joo and **S.-Y. Lee***, *Applied Surface Science* (2023)
- Effect of N doping on the microstructure and dry etch properties of amorphous carbon deposited with a DC sputtering system, S. Kim, M.-W. Jung, K. Kim, U. Kim, M. Kim, **S.-Y. Lee*** and Y.-C. Joo*, *RSC Advances* (2023)
- Bonding structure and etching characteristics of amorphous carbon for a hardmask deposited by DC sputtering, **S.-Y. Lee**, K.-T. Jang, M.-W. Jeong, S. Kim, H.-Y. Park, G.-T. Kim, G.-D. Lee, M.-Y. Kim, and Young-Chang Joo*, *Carbon*, 154 (2019)
- Electrophoretic kinetics of concentrated TiO₂ nanoparticle suspensions in aprotic solvent, **S.-Y. Lee**, J.-R. Yim, I.-S. Choi, K. T. Nam, S.-H. Lee and Y.-C. Joo*, *Electronic Materials Letters*, 14 (2018)
- Transmission Orientation Imaging of Copper Thin Films on Polyimide Substrates Intended for Flexible Electronics, **S.-Y. Lee**, H.-W. Guim, D.-I. Kim, Y.-C. Joo, C.-H. Shim, J.-P. Ahn, I.-S. Choi, and M. Abbasi*, *Scripta Materialia*, 138 (2017)
- Unveiling deformation mechanism of metal thin film under large strain, **S.-Y. Lee**, H. Zhou, C.-H. Shim, J.-P. Ahn, P. A. Gruber, Y.-C. Joo, H. Gao*, and I.-S. Choi*, *under preparation*
- Electrochemical oxidation of boron-doped nickel–iron layered double hydroxide for facile charge transfer in oxygen evolution electrocatalysts, I.-K. Ahn, **S.-Y. Lee**, H. G. Kim, G.-B. Lee, J.-H. Lee, M. Kim and Y.-C. Joo*, *RSC Advances*, 11(14) (2021)
- A study on the interfacial adhesion energy between capping layer and dielectric for Cu interconnects”, C. Kim, K. Son, G. Kim, S. Kim, S.-K. Lee, **S.-Y. Lee**, Y.-B. Park* and Y.-C. Joo*, *Microelectronics Reliability*, 116 (2021)
- Planar-Radial Structured Thermoelectric Cooler for Local Hot Spot Cooling in Mobile Electronics, C. Kim, H. Shen, J. Yoon, M.-W. Jeong, S. Kim, S.-H. Oh, S.-Y. Lee, Y. Joo, H. Lee* and Y.-C. Joo*, *2020 IEEE 70th*

Electronic Components and Technology Conference (ECTC) (2020)

- Metal-organic Framework driven Porous Cobalt Disulfide Nanoparticles Fabricated by Gaseous Sulfurization as Bifunctional Electrocatalysts for Overall Water Splitting, I.-K. Ahn, W. Joo, J.-H. Lee, H. Kim, **S.-Y. Lee**, Y. Jung, J.-Y. Kim, G.-B. Lee, M. Kim, and Y.-C. Joo*, *Scientific Reports*, 9 (2019)
- Stable Interconnect System for Horizontal Thermoelectric Coolers by Thermodynamic-Based Prediction, M.-W. Jeong, **S.-Y. Lee**, H.-B. Park, H.-J. Lee, and Y.-C. Joo*, *Electronic Materials Letters*, 15 (2019)
- Effect of the Thermal Annealing on the Stretchability and Fatigue Failure of the Copper Film on the Polymer Substrate, D.-J. Lee, J.-S. Lee, T.-W. Kim, **S.-Y. Lee**, Y.-B. Park, Y.-C. Joo, and B.-J. Kim*, *Journal of Electronic Materials*, 48 (2019)
- Improved Battery Performance of Nanocrystalline Si Anodes Utilized by Radio Frequency (RF) Sputtered Multifunctional Amorphous Si Coating Layers, I.-K. Ahn, Y.-J. Lee, S.-K. Na, **S.-Y. Lee**, D.-H. Nam, J.-H. Lee*, and Y.-C. Joo*, *ACS Applied Materials & Interfaces*, 10 (2018)
- Electromigration Characteristics and Morphological Evolution of Cu Interconnects on CVD Co and Ru Liners for 10-nm Class VLSI Technology, K.-T. Jang, **S.-Y. Lee**, S.-K. Na, S.-K. Lee, J.-M. Baek, W.-K. You, O.-H. Park, R.-H. Kim, H.-S. Oh, and Y.-C. Joo*, *IEEE Electronic Device Letters*, 39 (2018)
- 2D reentrant auxetic structures of graphene/CNT networks for omnidirectionally stretchable supercapacitors, B. S. Kim, K. Lee, S. Kang, **S.-Y. Lee**, J. B. Pyo, I.-S. Choi, K. Char, J. H. Park, S.-S. Lee, J. Lee and J. G. Son*, *Nanoscale*, 9 (2017)
- Tunable Sn Structures in Porosity-Controlled Carbon Nanofibers for All-Solid-State Lithium-Ion Battery Anodes, D.-H. Nam, J. W. Kim, J.-H. Lee, **S.-Y. Lee**, H.-A.-S. Shin, S.-H. Lee, and Y.-C. Joo*, *Journal of Materials Chemistry A*, 3 (2015)
- One-step structure modulation of electrospun metal-loaded carbon nanofibers: Redox reaction controlled calcination, D.-H. Nam, J.-H. Lee, N.-R. Kim, Y.-Y. Lee, H.-W. Yeon, **S.-Y. Lee**, and Y.-C. Joo, 82 *Carbon* (2015)
- Electrical current-induced gradual failure of crystalline Ge₂Sb₂Te₅ for phase-change memory, Y.-J. Park, T.-Y. Yang, J.-Y. Cho, **S.-Y. Lee**, and Y.-C. Joo*, *Applied. Physics Letters*, 103 (2013)
- Enhanced conductivity of solution-processed indium tin oxide nanoparticle films by oxygen partial pressure controlled annealing, N.-R. Kim, J.-H. Lee, Y.-Y. Lee, D.-H. Nam, H.-W. Yeon, **S.-Y. Lee**, T.-Y. Yang, Y.-J. Lee, A. Chu, K. T. Nam, and Y.-C. Joo*, *Journal of Materials Chemistry C*, 37 (2013)

PATENT

- I.-S. Choi, S.-Y. Lee, Y.-C. Joo, J.-H. Lee, “Complex of Organic Material and Metal”
Korea - Application No.10-2016-0088151
- S.-Y. Lee, J.-H. Hyun, E. Kim, Y.-C. Joo, S. Lee, “Copper-Aluminum alloy and its manufacturing method”
Korea - Application No.10-2023-0145991
- B.-J. Kim, J. Shin, I.-S. Choi, S.-Y. Lee, Y.-C. Joo, S. Lee, “Cu-Ag alloy material, method of manufacturing the same and stretchable/foldable electronic device including the optoelectronic device”
Korea - Application No.10-2023-0195677

PRESS RELEASES

- News on Dongascience (Oct 21th, 2019)
<http://dongascience.donga.com/news/view/31894>