

Manufacturing and Instrumentation

Laboratory (MNIL)

생산 및 계측 연구실

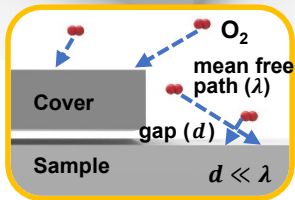
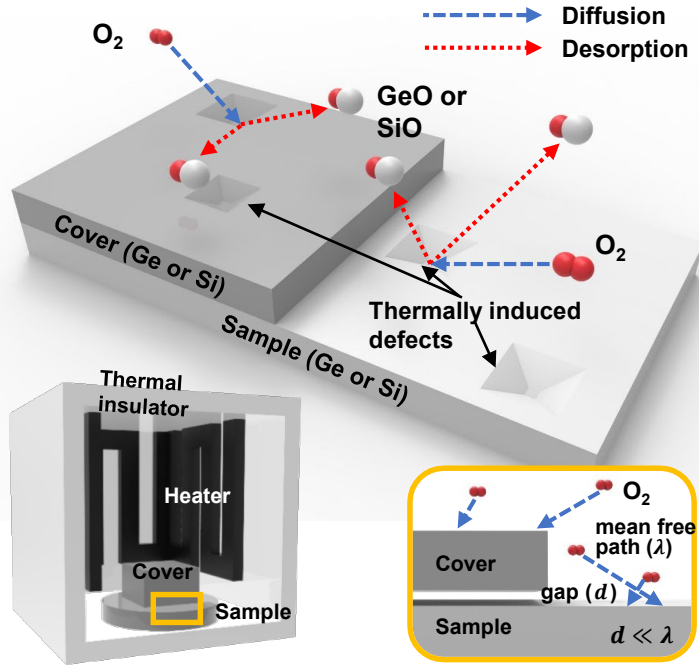
Professor Jungchul Lee

이정철 교수님

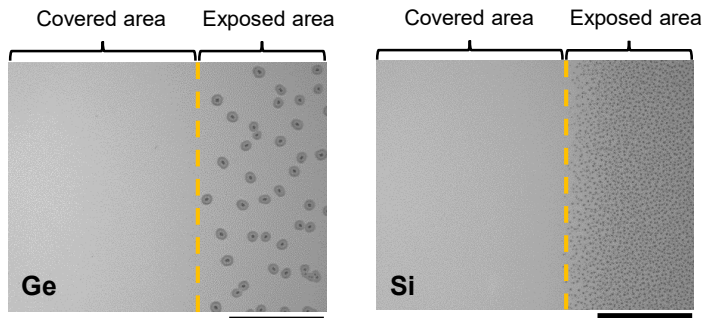


고온 어닐링을 이용한 반도체 소재 기술

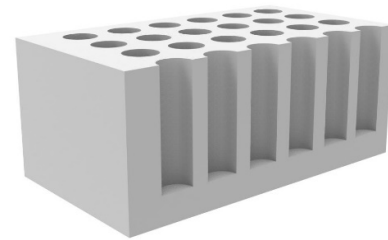
고온 어닐링 시 반도체 물질 결함 방지 기술 개발



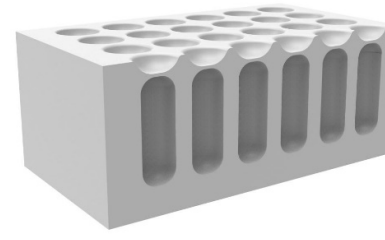
Annealed samples with the overlaid cover removed



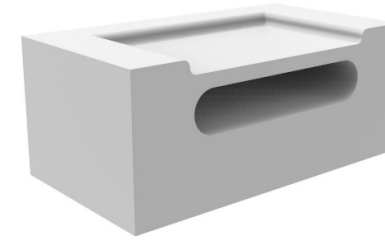
고온 어닐링을 이용한 반도체 웨이퍼 내부 공동 제작 기술 개발



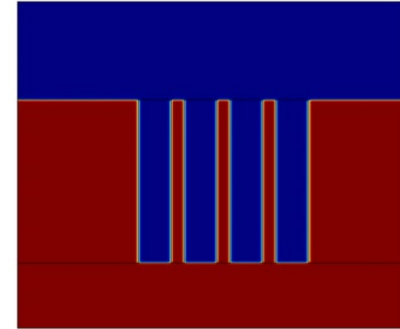
1. Hole patterning



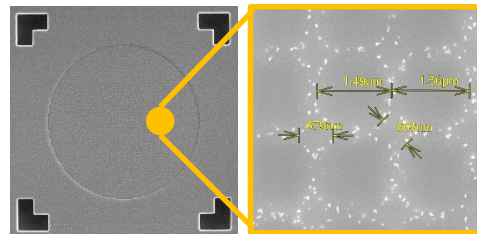
2. Individual vertical cavity formation



3. Merged horizontal cavity formation

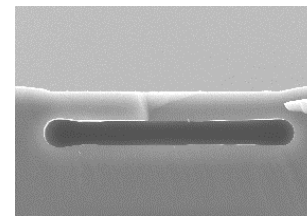


Top view

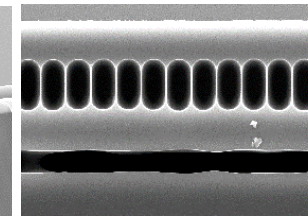


100 μm

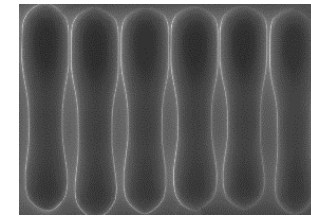
Cross section view



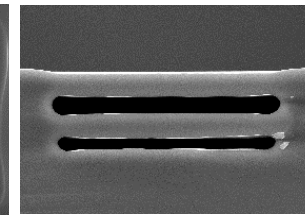
10 μm



5 μm

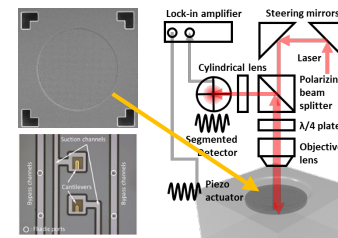
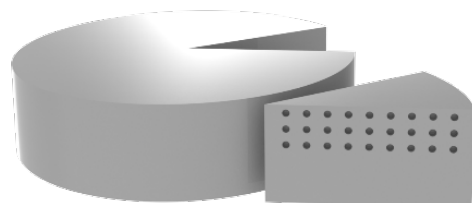


3 μm

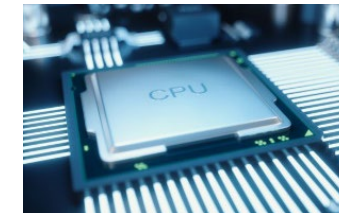


10 μm

반도체 공동 웨이퍼



MEMS pressure and particle sensors



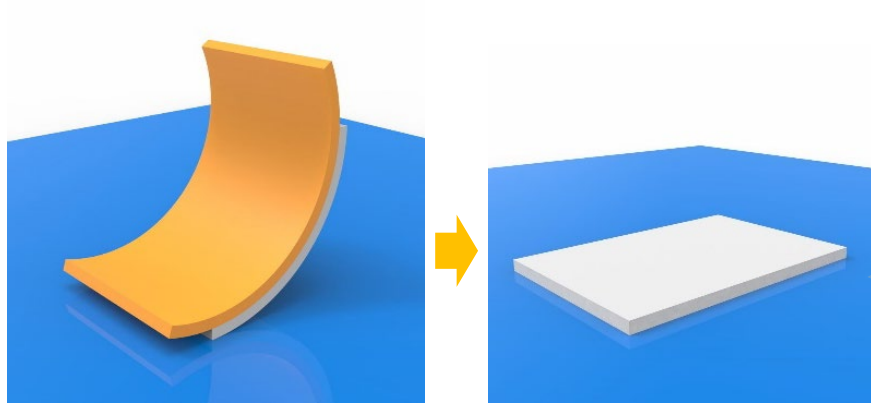
System semiconductors



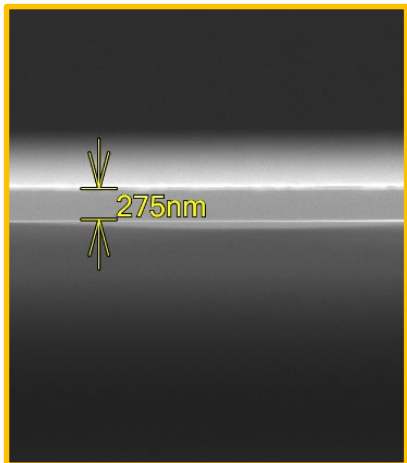
Solar cell

고온 어닐링 이용 단결정 나노 입자/박막/기능성 웨이퍼의 제작 기술

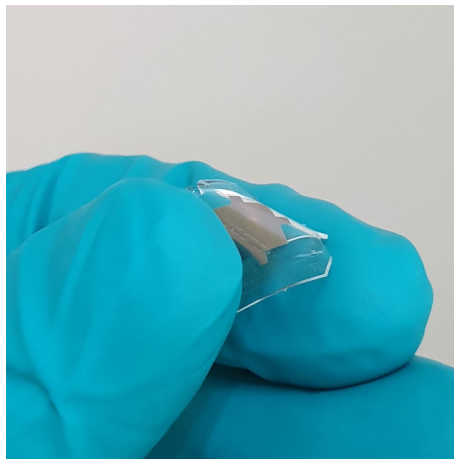
단결정 실리콘 및 반도체 박막 제작 및 전사



Silicon thin film transfer to target substrate

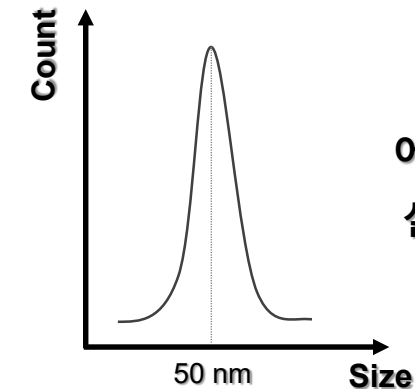
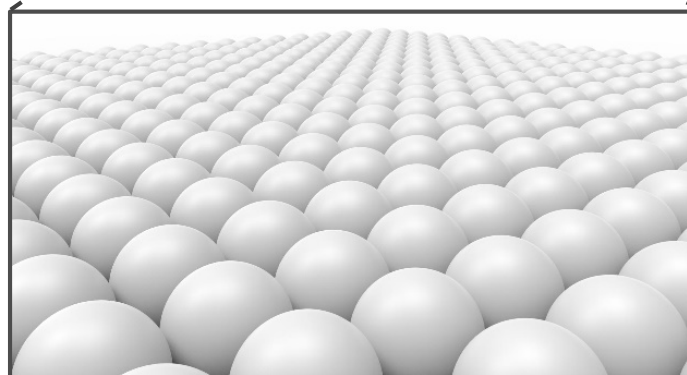
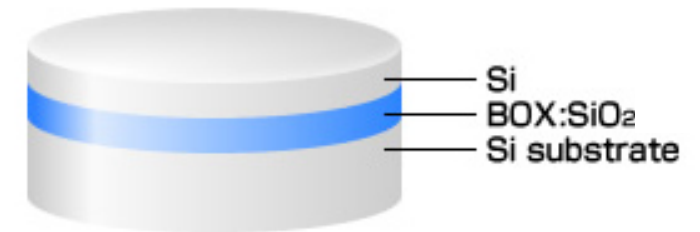
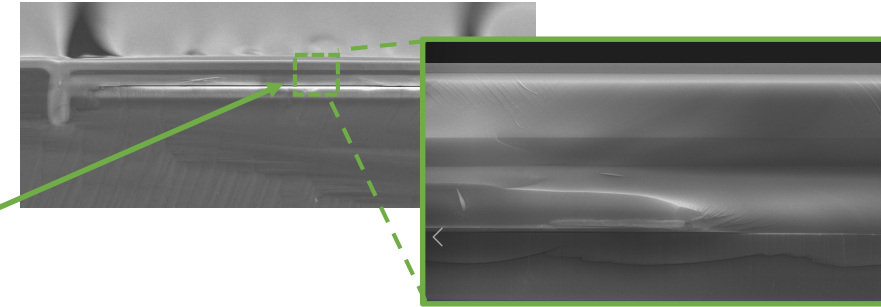
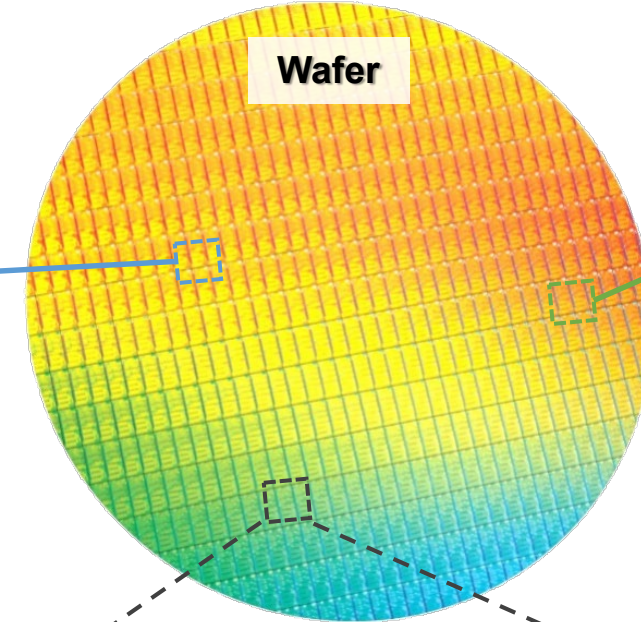


Nanoscale silicon thin film



Silicon thin film on PDMS

산화 기반 silicon-on-insulator (SOI) 웨이퍼 제작

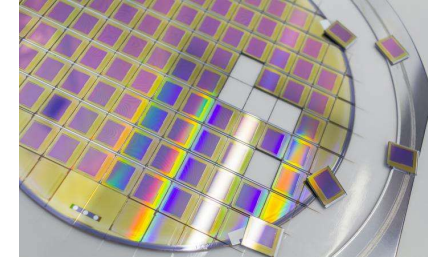
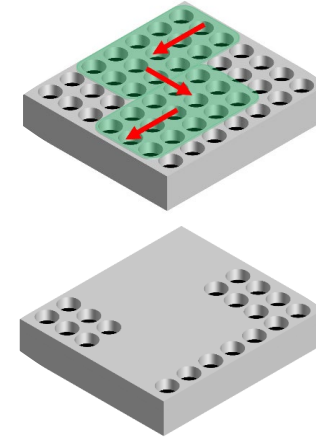
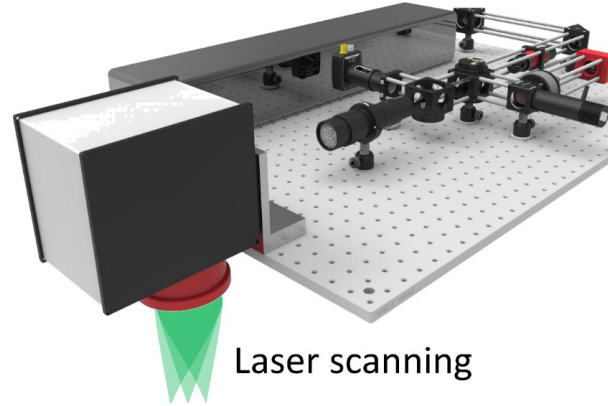
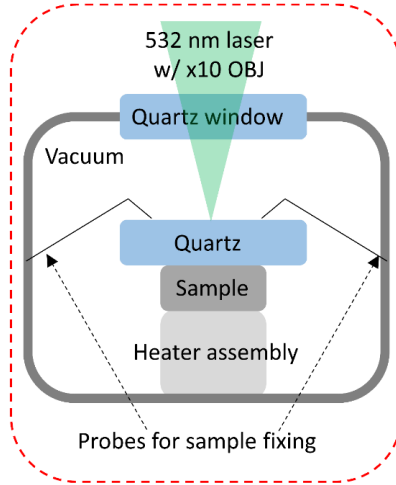
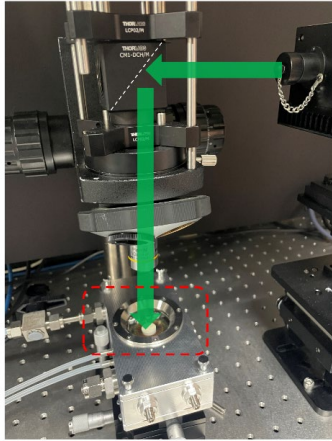


어닐링 기반 top-down
실리콘 나노입자 제작



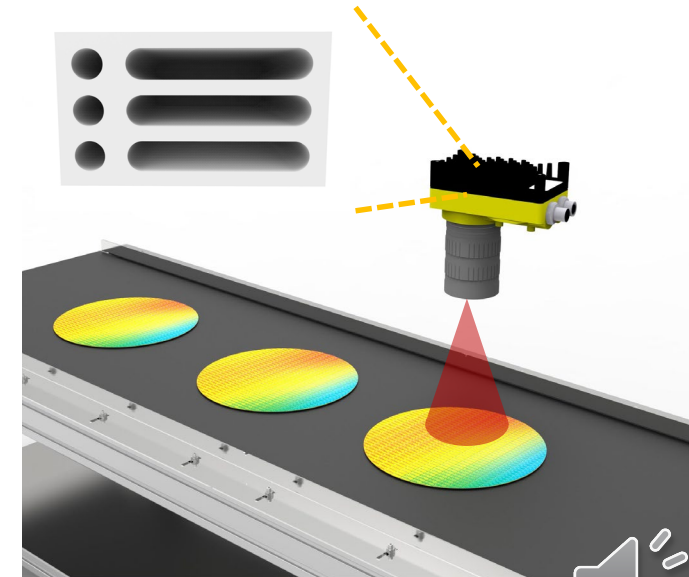
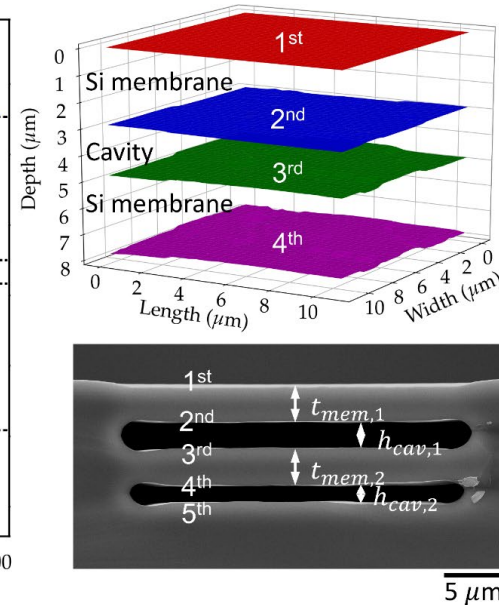
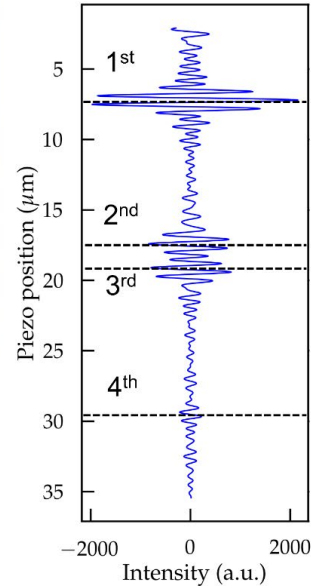
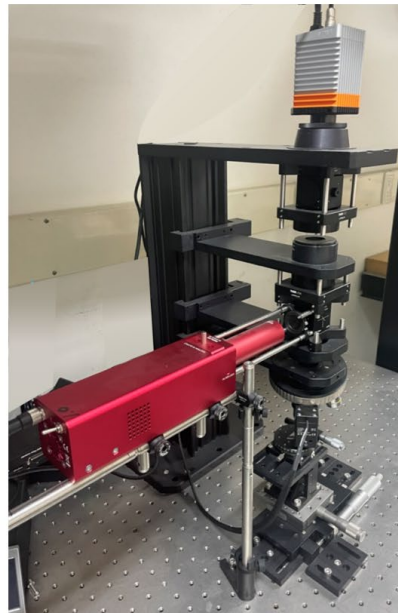
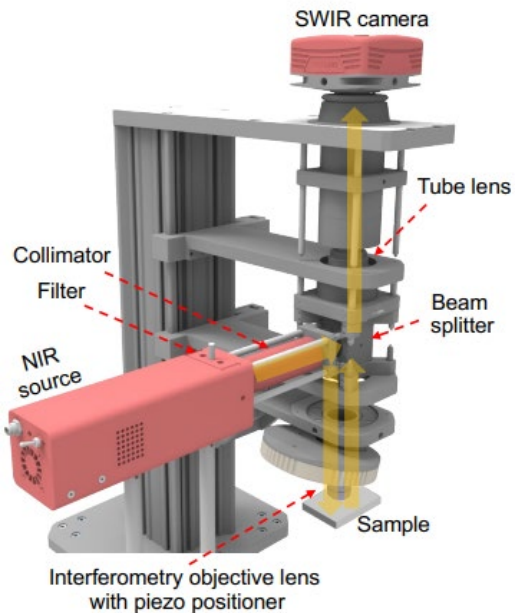
반도체 소재/부품의 공정 및 비파괴 검사 장비

자유로운 국소
패터닝을 위한
레이저 어닐링



Customized
MEMS/NEMS 서비스

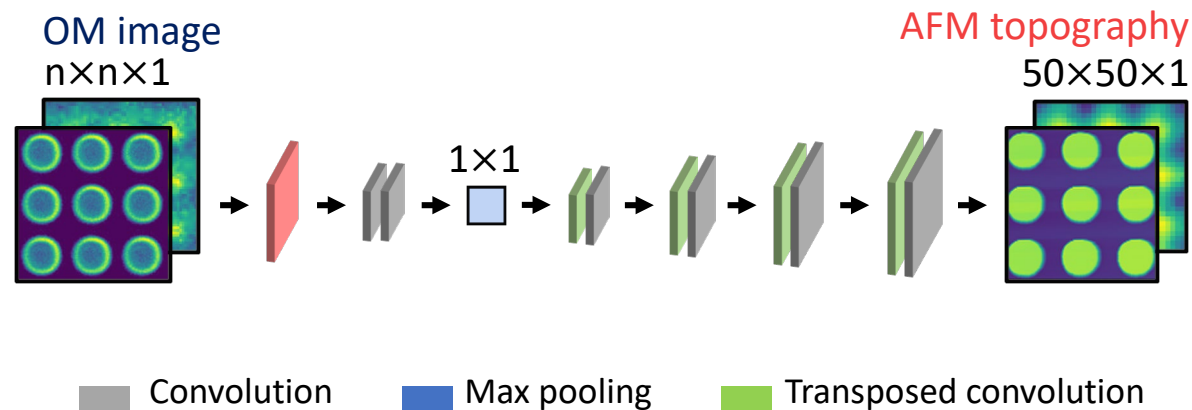
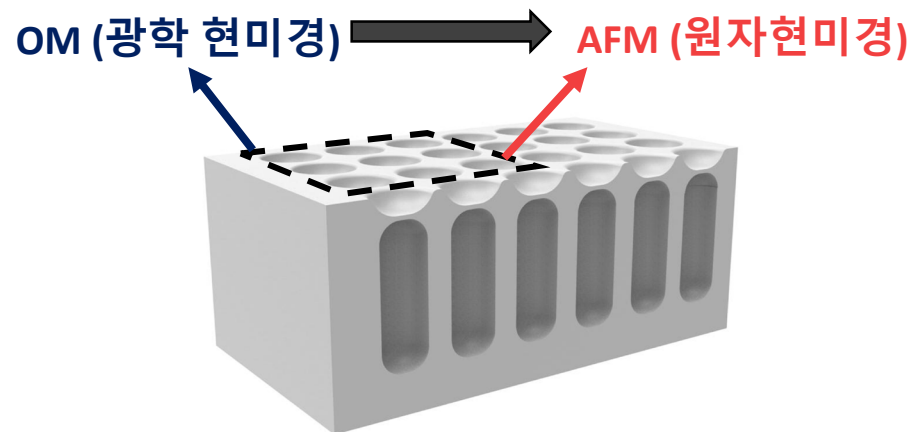
고온 어닐링 캐비티
웨이퍼의 비파괴 검사



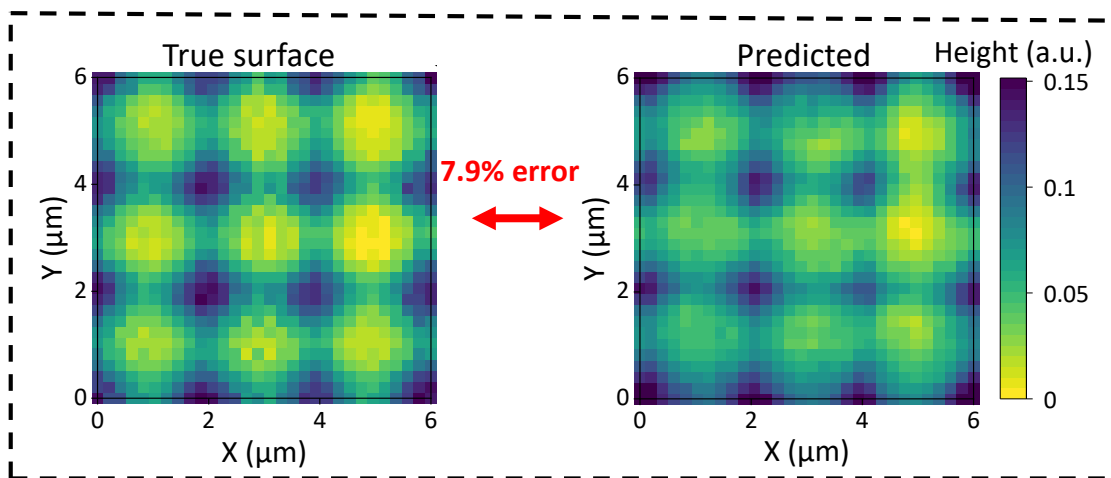
반도체 in-line 검사

고온 어닐링 구조의 고속 검사를 위한 머신 러닝 적용

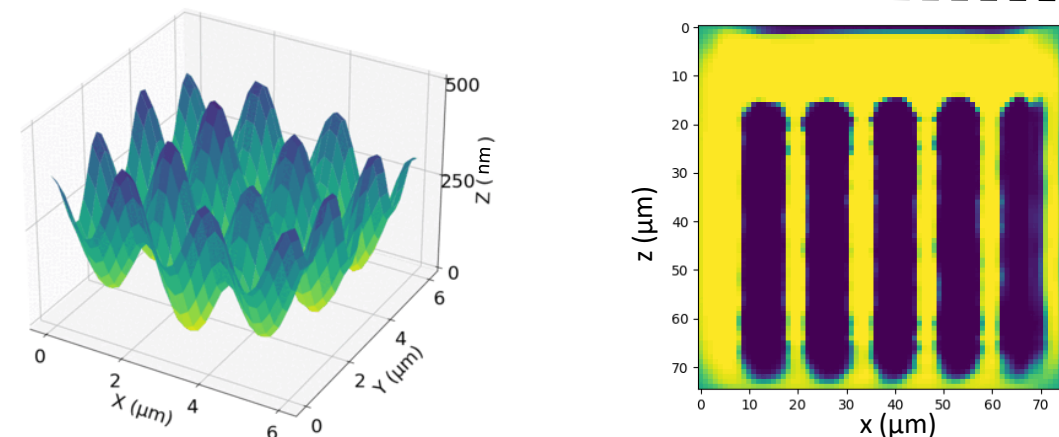
머신 러닝 기반 예측



3D 구조 및 형상 예측

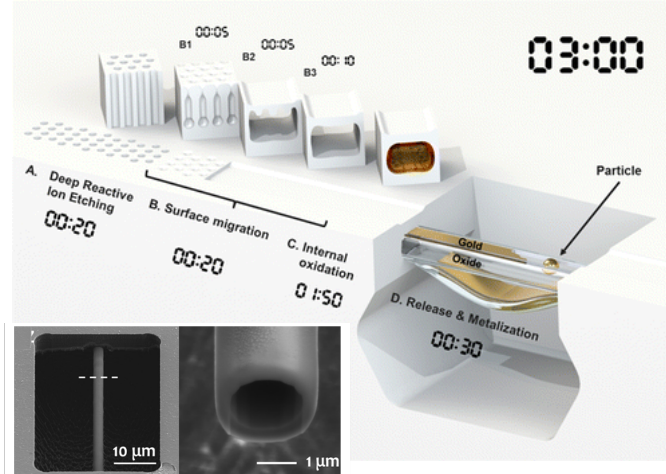
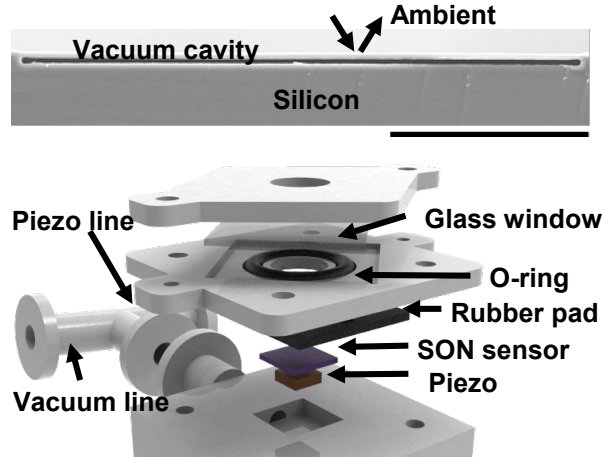


공정 과정 예측

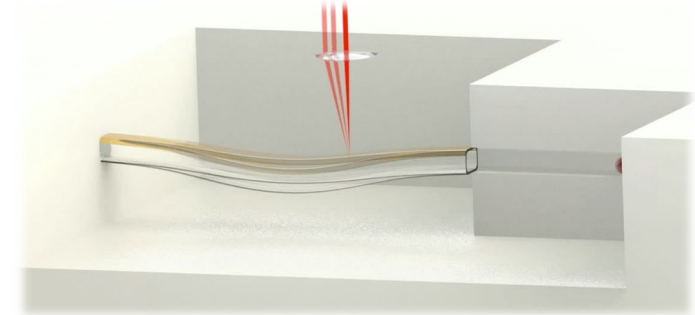


고온 어닐링 캐비티 기반 고성능 및 고감도 센서

공진 특성을 이용한 압력 및 입자 질량 센서



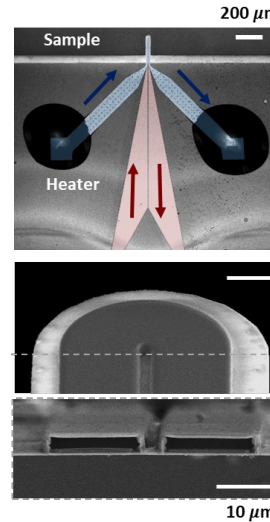
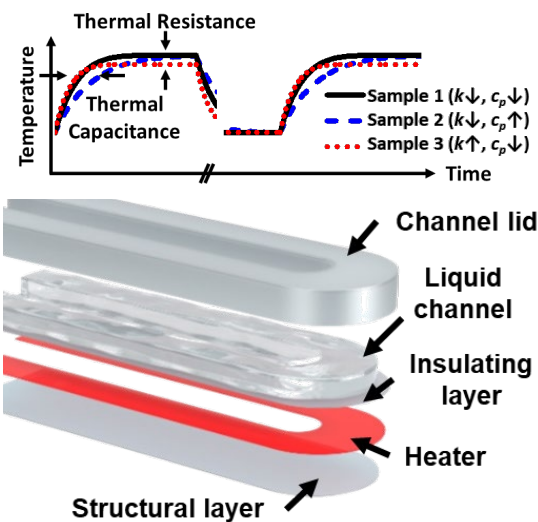
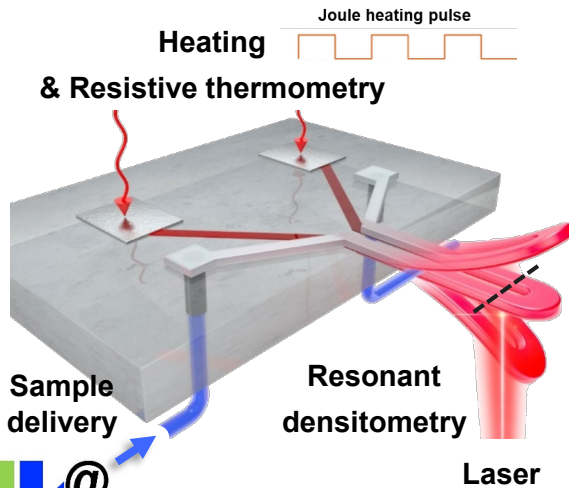
입자 질량 센서



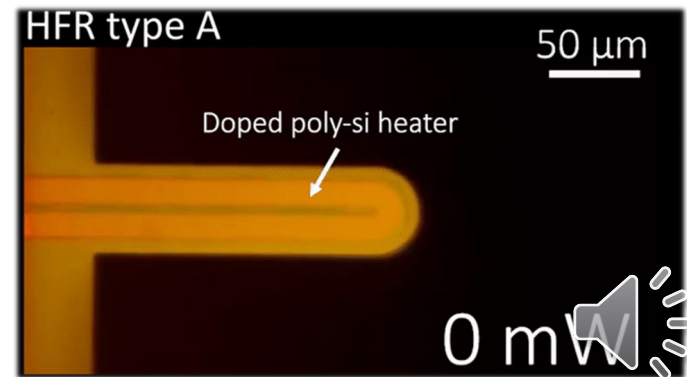
입자 질량 센서 + 광학 센서



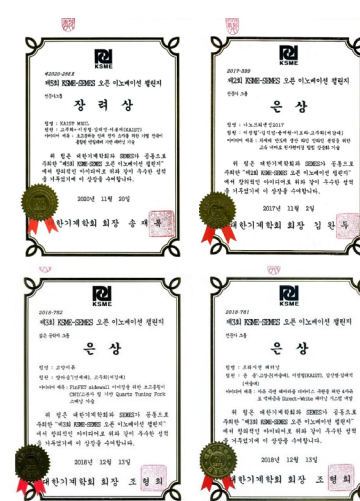
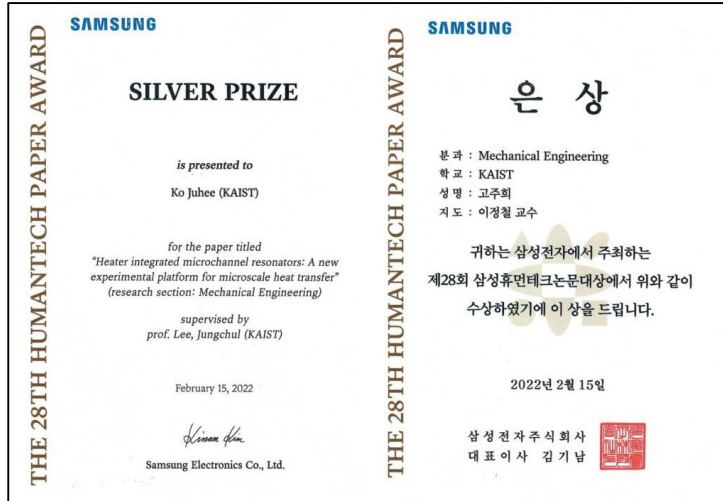
공진 및 온도 측정을 이용한 열물성 센서



밀도 센서 + 온도 센서



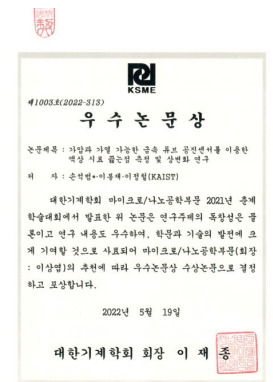
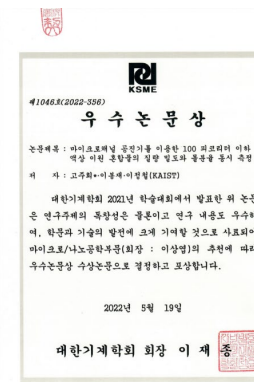
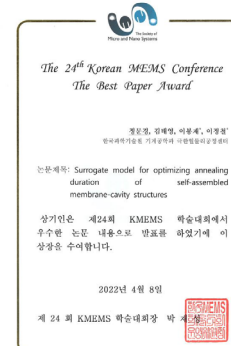
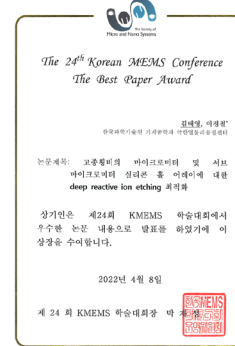
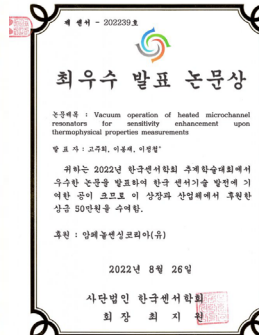
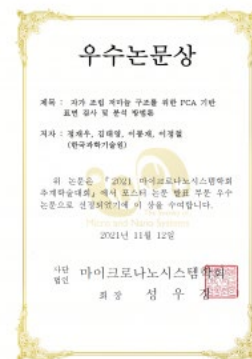
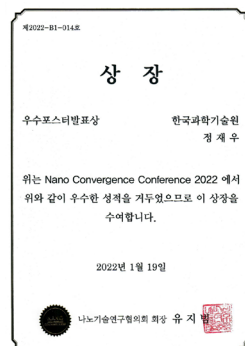
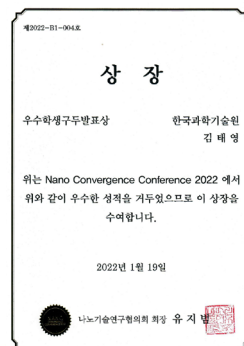
수상 실적



2022 삼성 휴먼테크 은상
2018 삼성 휴먼테크 금상
2016 삼성 휴먼테크 금상
2016 삼성 휴먼테크 은상

2021 SEMES (전문가) 동상
2020 SEMES (전문가) 장려상
2018 SEMES (공학자) 은상
2018 SEMES (전문가) 은상
2017 SEMES (전문가) 은상

2022 국제학회 (NMC) 우수포스터상



그 외 2021~2022년 우수 구두/포스터 발표상 다수



논문 실적



Publication in 2022 (as the 1st and corresponding author)

Nanomechanical Sensing Using Heater-Integrated Fluidic Resonators

Juhee Ko, Faheem Khan, Youngsuk Nam, Bong Jae Lee, and Jungchul Lee*

✓ Cite this: *Nano Lett.* 2022, XXXX, XXX, XXX-XXX

Publication Date: August 18, 2022 ✓

<https://doi.org/10.1021/acs.nanolett.2c01572>

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[Jaewoo Jeong](#), [Taeyeong Kim](#), [Bong Jae Lee](#) & [Jungchul Lee](#) ✉

Scientific Reports 12, Article number: 7205 (2022) | [Cite this article](#)

Scientific Reports



Sensors and Actuators B: Chemical
Volume 367, 15 September 2022, 132133



Towards highly specific measurement of binary mixtures by tandem operation of nanomechanical sensing system and micro-Raman spectroscopy

Juhee Ko ^{a, b}, Bong Jae Lee ^{a, b}, Jungchul Lee ^{a, b, ✉}

ADVANCED ENGINEERING MATERIALS

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Subsurface Imaging of Microfabricated Silicon Membrane-Cavity Structures Using Near-Infrared Interferometry

Mun Goung Jeong, Taeyeong Kim, Bong Jae Lee ✉, Jungchul Lee ✉



Vacuum
Volume 201, July 2022, 111101



Self-assembled silicon membrane resonator for high vacuum pressure sensing

Taeyeong Kim ^{a, b, 1}, Juhee Ko ^{a, b, 1}, Jungchul Lee ^{a, b, ✉}

Letter | [Open Access](#) | Published: 09 September 2022

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Formation, evolution, and prevention of thermally induced defects on germanium and silicon upon high-temperature vacuum annealing

JVAST:A

Journal of Vacuum Science & Technology A 39, 060403 (2021); <https://doi.org/10.1116/6.0001308>

✉ Taeyeong Kim^{1,2}, ✉ Mun Goung Jeong^{1,2}, ✉ Bong Jae Lee^{1,2,✉}, and ✉ Jungchul Lee^{1,2,✉}

Thick Germanium-on-Nothing Structures by Annealing Microscale Hole Arrays With Straight Sidewall Profiles

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