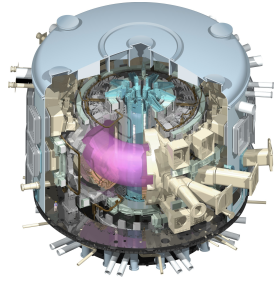
Assignment 1 & 2

Course 10401



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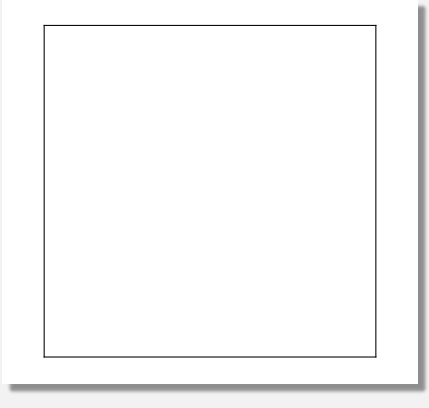
January 17, 2019

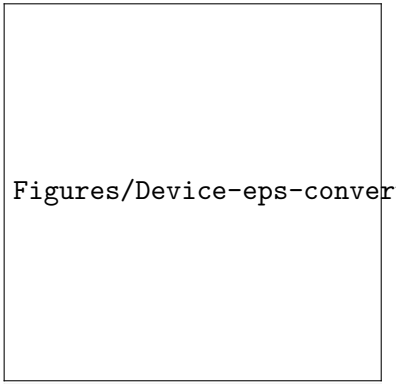
Introduction

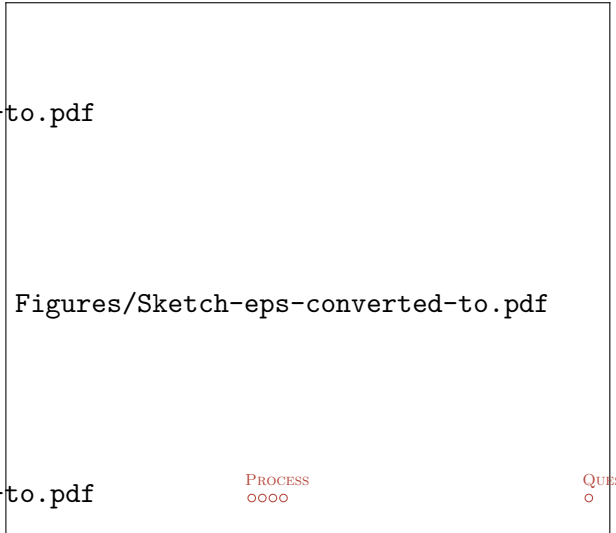
L. R. Alcala-Jimenez, T. Passer, A. Lei, and E. V. Thomsen
"Increased Mechanical Robustness of Piezoelectric Magnetoelastic Vibrational Energy Harvesters"
43rd International conference on Micro and Nano Engineering, (2017)

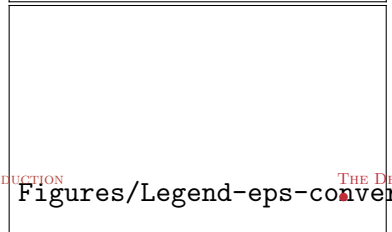
"This study presents a fabrication process for a mechanically robust piezo electric cantilever-based VEH suitable for magnetoelastic energy harvesting."



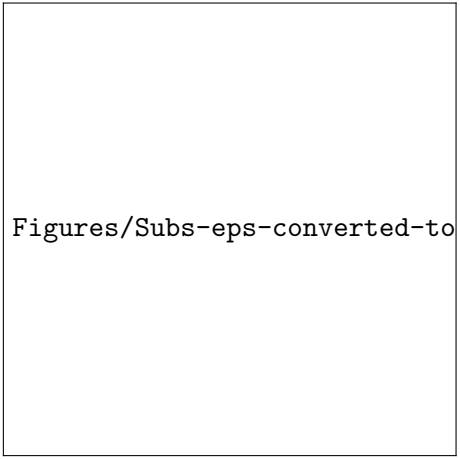
Piezoelectric Magnetoelastic Vibrational Energy Harvester





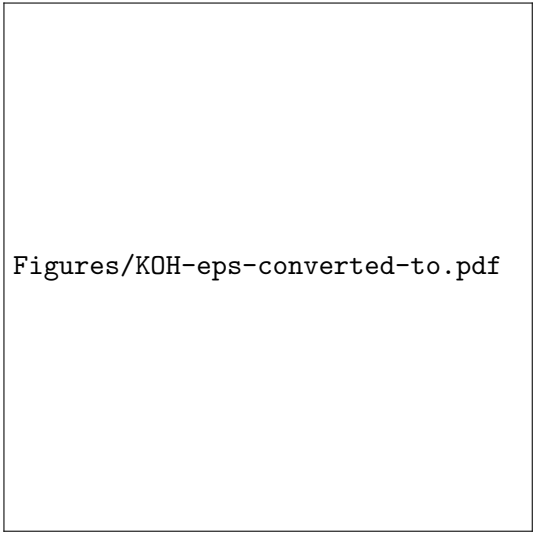


Growth and Mask



Substrate wafer	350 µm, DSP, $5.08 \times 10^{19}\,\mathrm{cm}^{-3}$ phosphorus doped, $\{100\}$ oriented silicon wafer
Cleaning	RCA clean
Wet Oxide Growth	12 h 55 min @ 1150 °C: 3000 nm
Lithography mask	1.50 µm AZ 4562 positive resist

Groove and rounding corners



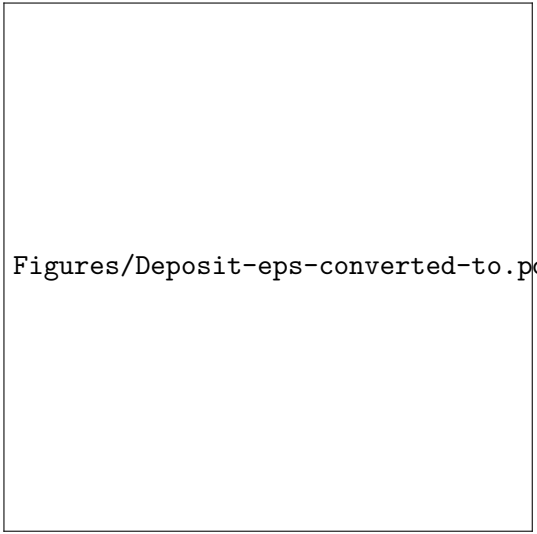
Silicon Etch 20% KOH @ 80 °C for 3 h 36 min: 54.7° 310 µm groove

BHF Oxide Etch 45 min @ 70 nm/min

Cleaning RCA clean

Wet Oxide Growth 126 min @ 1100 °C: 1000

Deposit and liftoff



- Ti/Pt sputtering $39\,\mathrm{W/cm^2}$ at $10\,\mathrm{cm}$

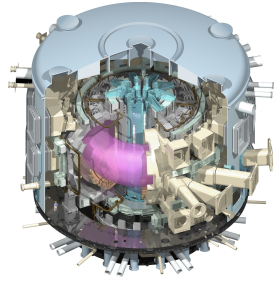
Beam Release and foiling

Lithography 5 µm AZ 4562 positive resist

Dry Silicon Ethc STS ICP Advanced Silicon Etcher system. Vertical etch at 3000 nm/min for silicon.

Dicing Disco DAD321. Electrostatic tape holds the wafer still. Removed

Questions



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