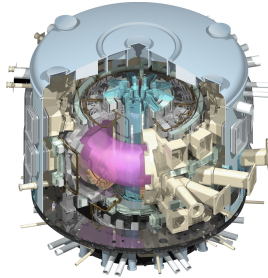


ASSIGNMENT 1 & 2

COURSE 10401



NICKLAS KIHM (s143286)

RASMUS KRONBORG FINNEMANN WIUFF (s163977)

JANUARY 17, 2019

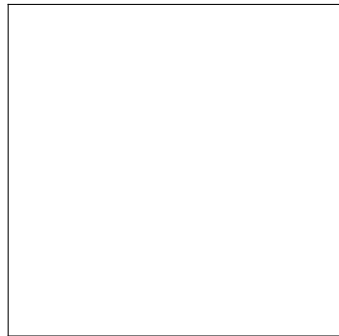
INTRODUCTION

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

Figures/Device-eps-converted-to.pdf

Figures/Sketch-eps-converted-to.pdf

INTRODUCTION

○

THE DEVICE

Figures/Legend-eps-converted-to.pdf

PROCESS

○○○○

QUESTIONS

○

GROWTH AND MASK

SUBSTRATE WAFER 350 μm , DSP,
 $5.08 \times 10^{19} \text{ cm}^{-3}$
phosphorus doped,
{100} oriented silicon
wafer

CLEANING RCA clean

WET OXIDE GROWTH 12 h 55 min @ 1150 $^{\circ}\text{C}$:
3000 nm

LITHOGRAPHY MASK 1.50 μm AZ 4562
positive resist

Figures/Subs-eps-converted-to.pdf

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

INTRODUCTION

WET OXIDE GROWTH 126 min @ 1100 °C:

1000

Figures/KOH-eps-converted-to.pdf

PROCESS

○○○

QUESTIONS

○

DEPOSIT AND LIFTOFF

Figures/Deposit-eps-converted-to.pdf

INTRODUCTION

Ti/Pt SPUTTERING 39 W/cm² at 10 cm

THE DEVICE

PROCESS
○○●○

QUESTIONS
○

BEAM RELEASE AND FOILING

LITHOGRAPHY 5 μm AZ 4562 positive resist

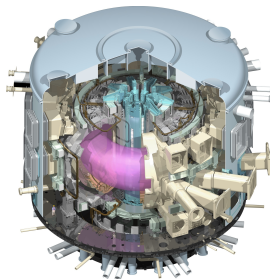
DRY SILICON ETCH STS ICP Advanced Silicon Etcher system. Vertical etch at 3000 nm/min for silicon.

DICING Disco DAD321.

Electrostatic tape holds the wafer still. Removed

Figures/Cantirelease-eps-converted-t

QUESTIONS



NICKLAS KIHM (s143286)
RASMUS KRONBORG FINNEMANN WIUFF (s163977)

JANUARY 17, 2019