

MPC-EX MINIPAD SENSOR FABRICATION STATUS

Ewha womans university

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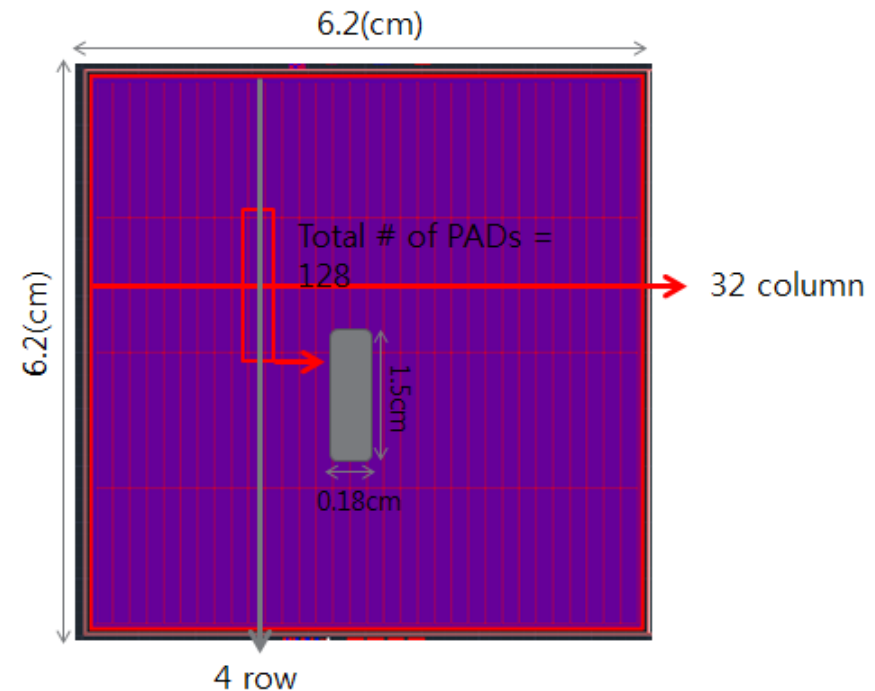
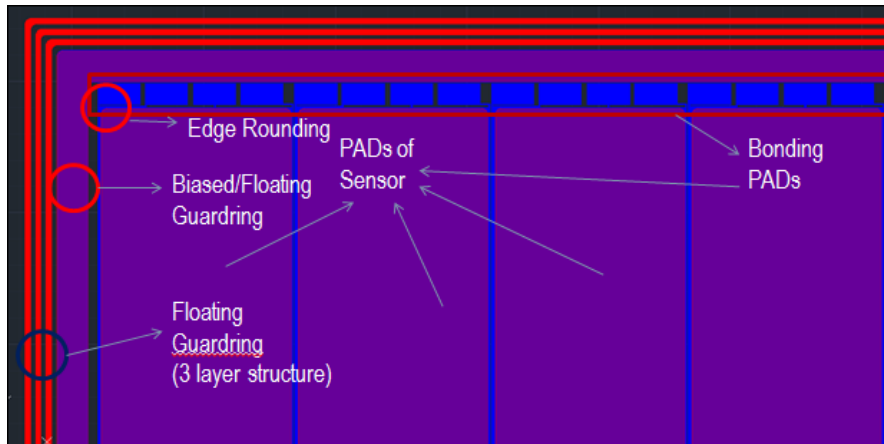
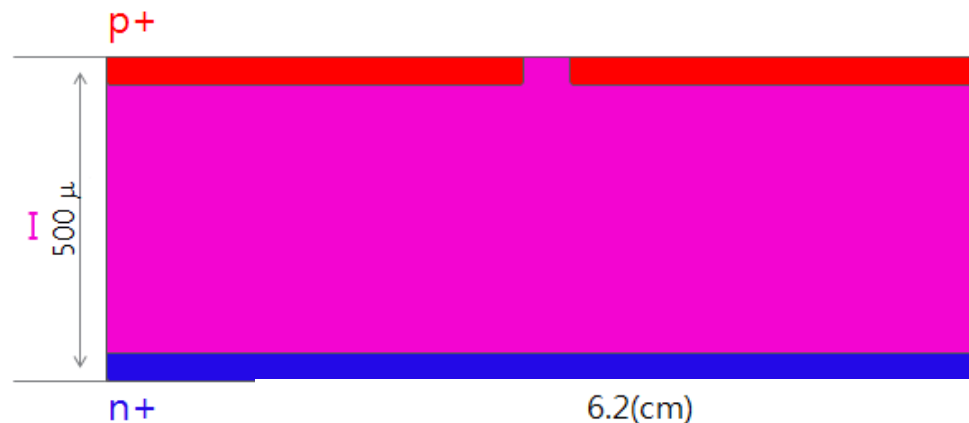
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- Summary

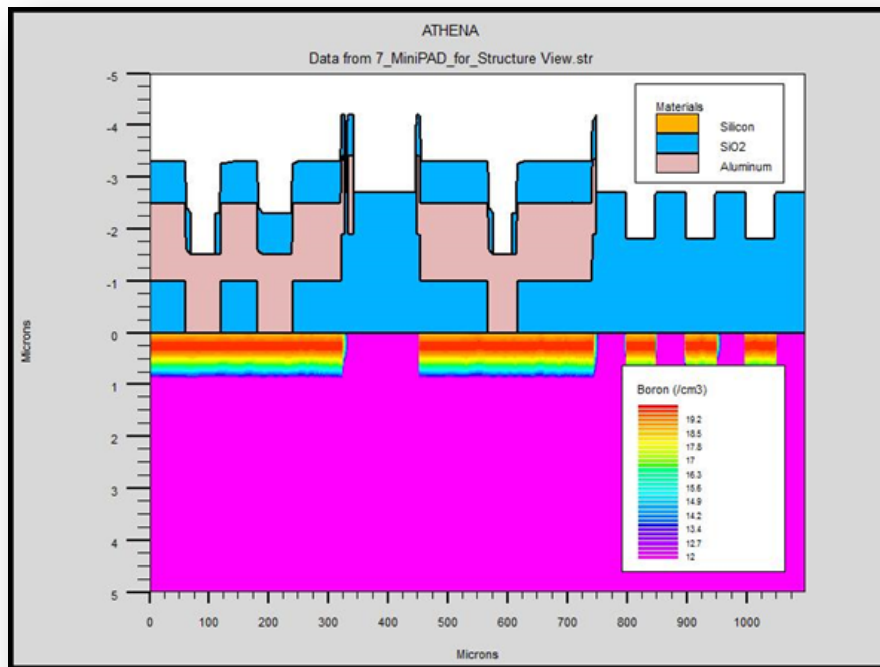
Introduction

Structure of minipad sensor

Vertically, PIN-structured ('p+'-intrinsic-'n+') silicon sensor



Sensor Fabrication Steps



Thermal oxidation

Backside : POCl₃ defusion

Front pattern etching

Front p⁺ implant + Guardring

Metalization and Etching

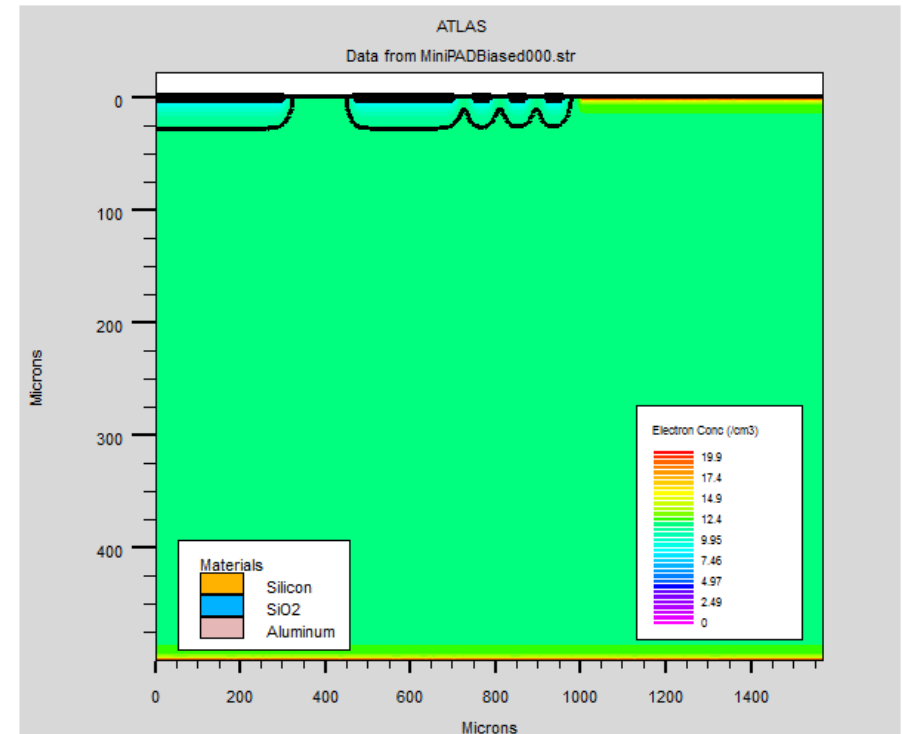
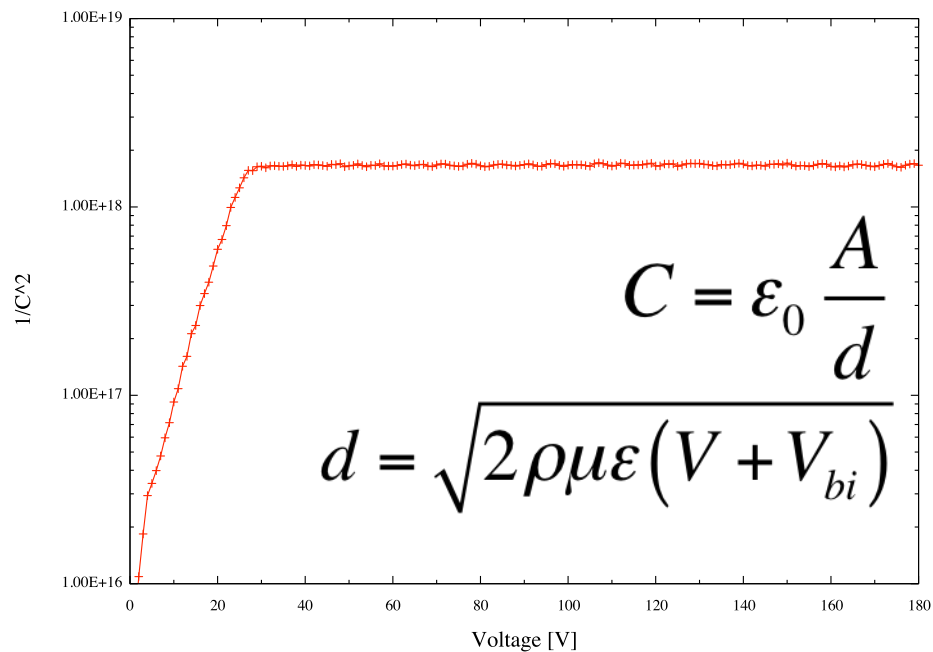
Passivation : Oxidation

Short list of Q&A

- Depletion volume - CV
- Process
 - Overall quality – Total leakage current measurement
 - Metallization – Short test
- Dicing quality
 - Leakage current stability
- Response to the ionizing particle – Photo current

Depletion volume

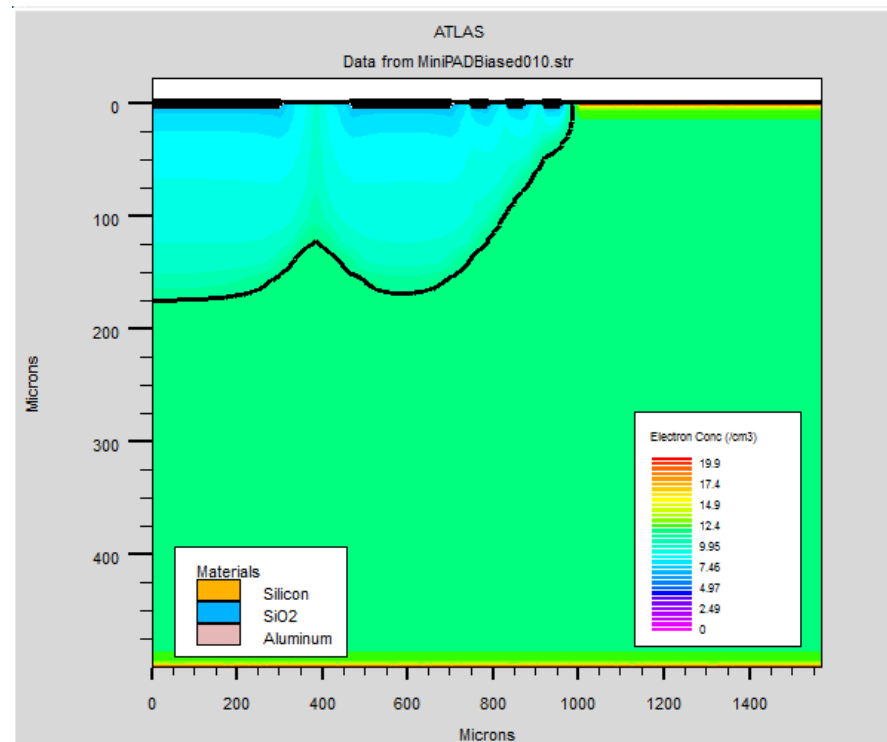
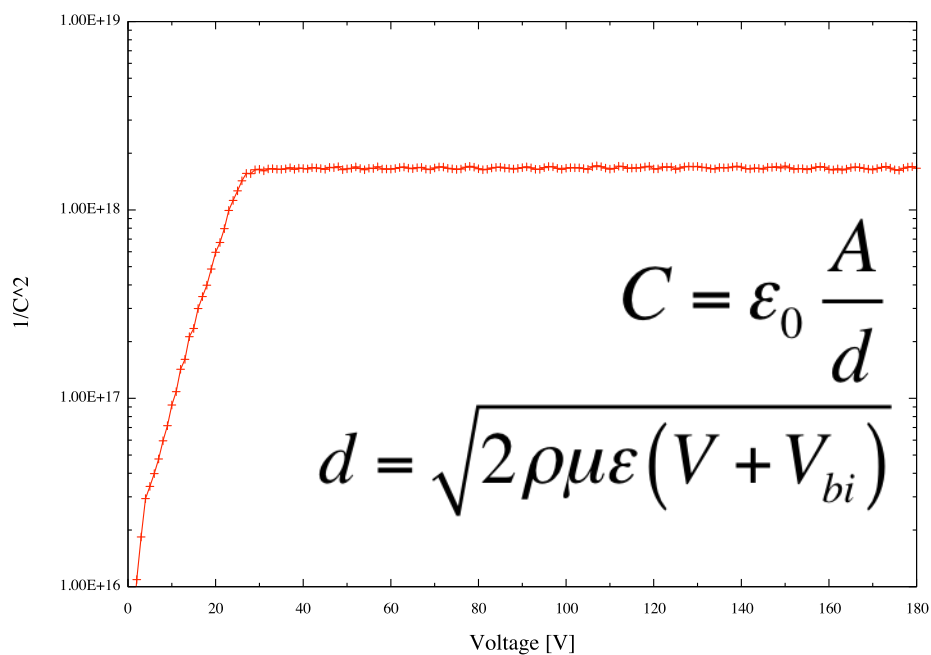
- CV test



0 V

Depletion volume

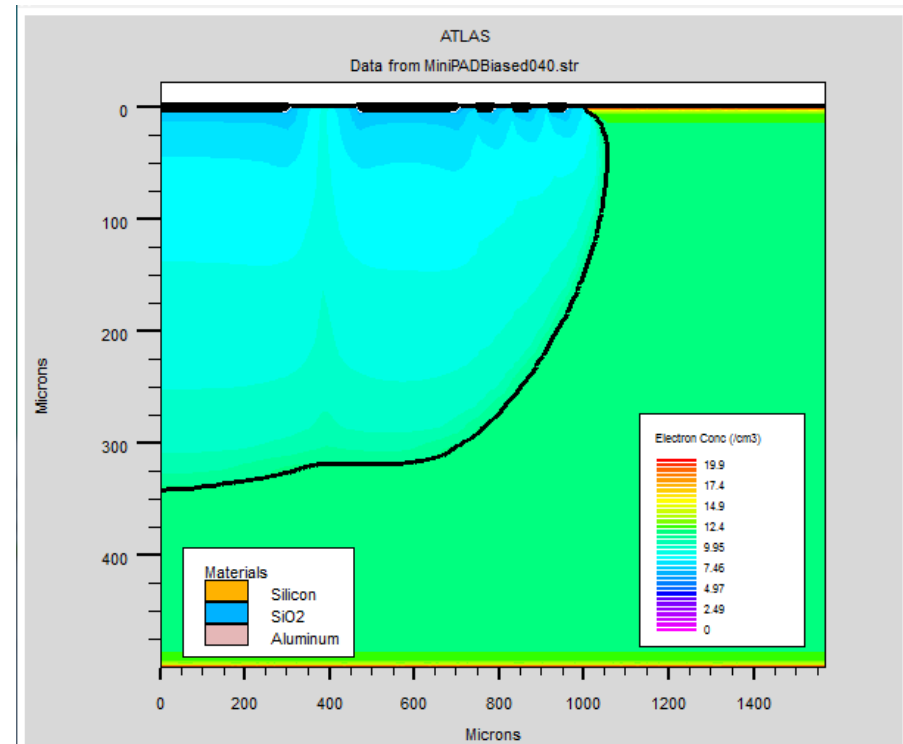
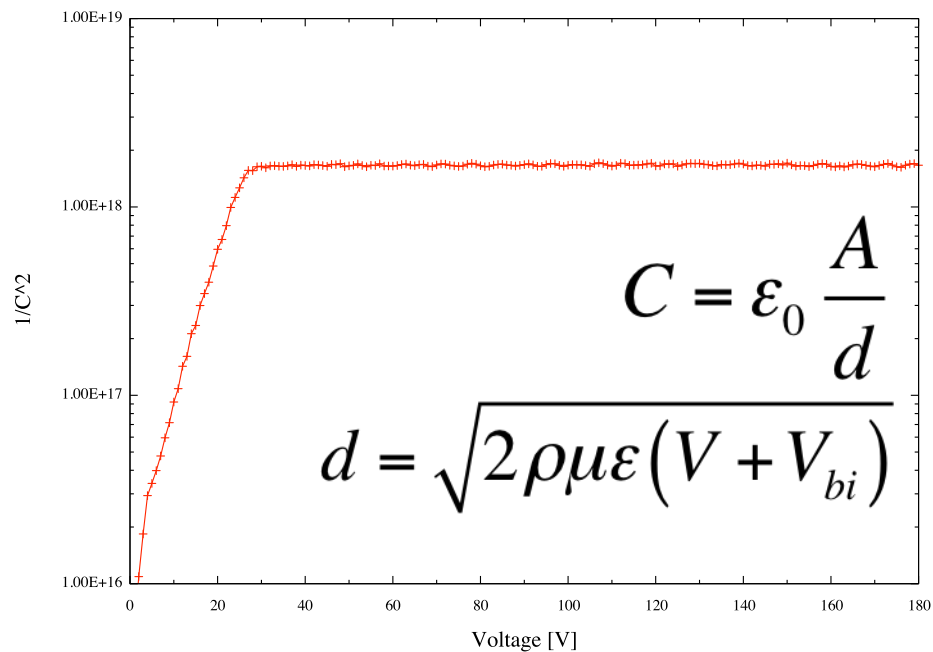
- CV test



10 V

Depletion volume

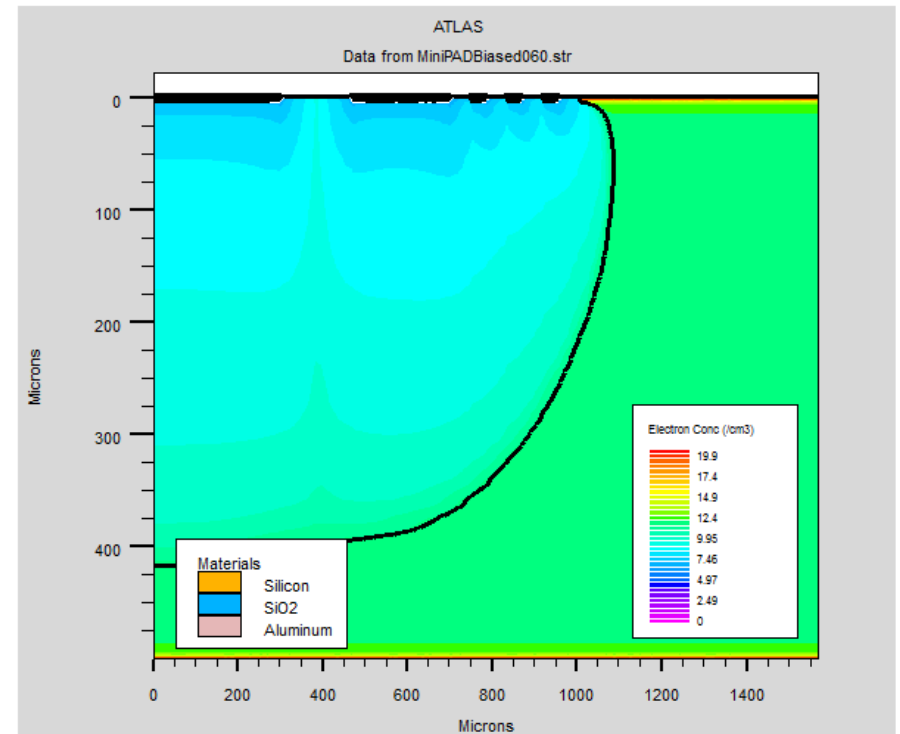
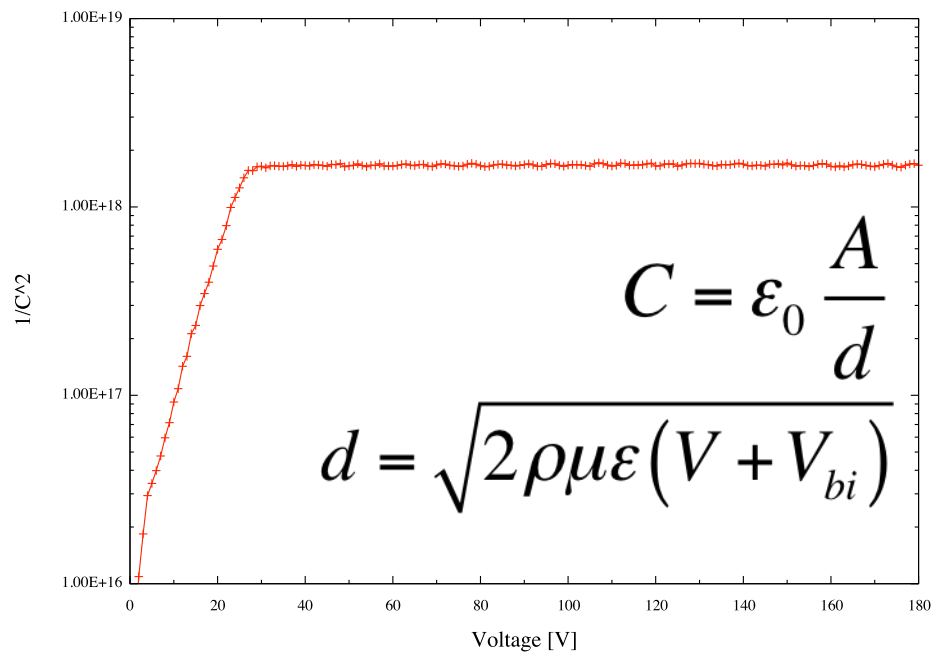
- CV test



40 V

Depletion volume

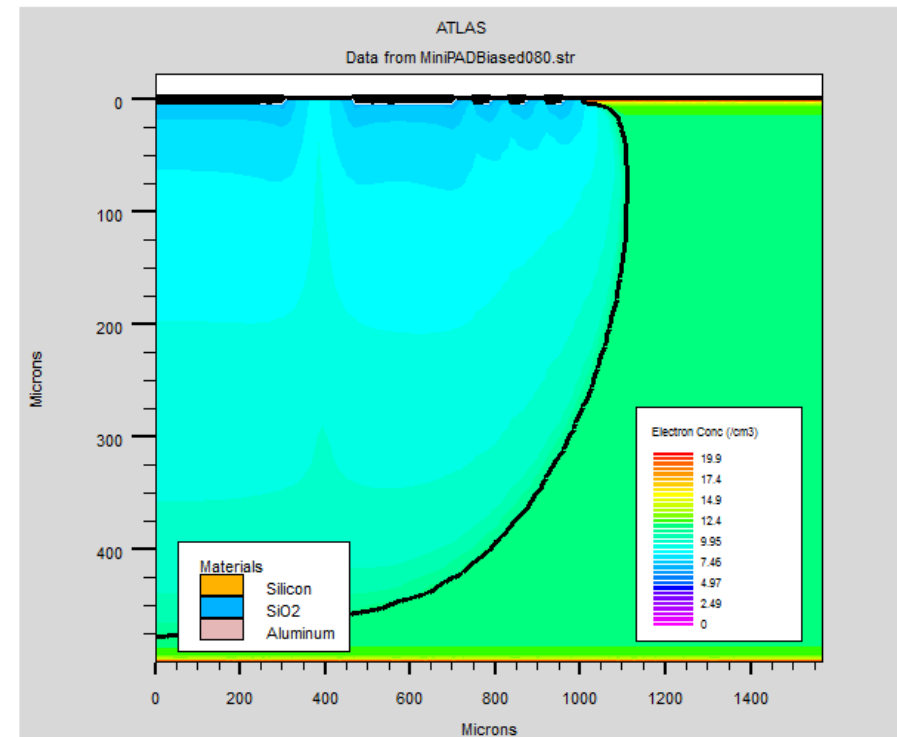
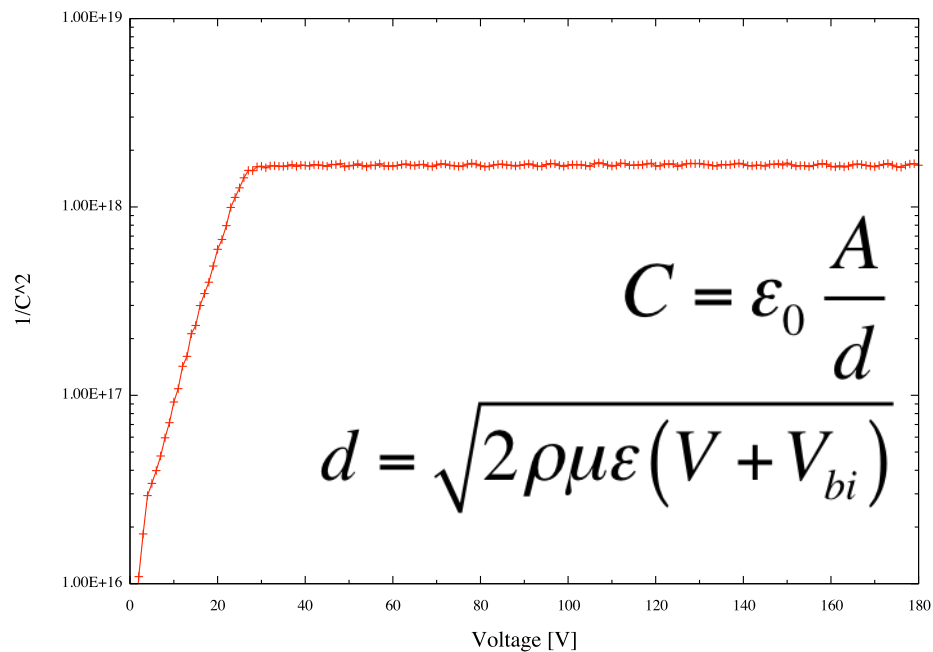
- CV test



60 V

Depletion volume

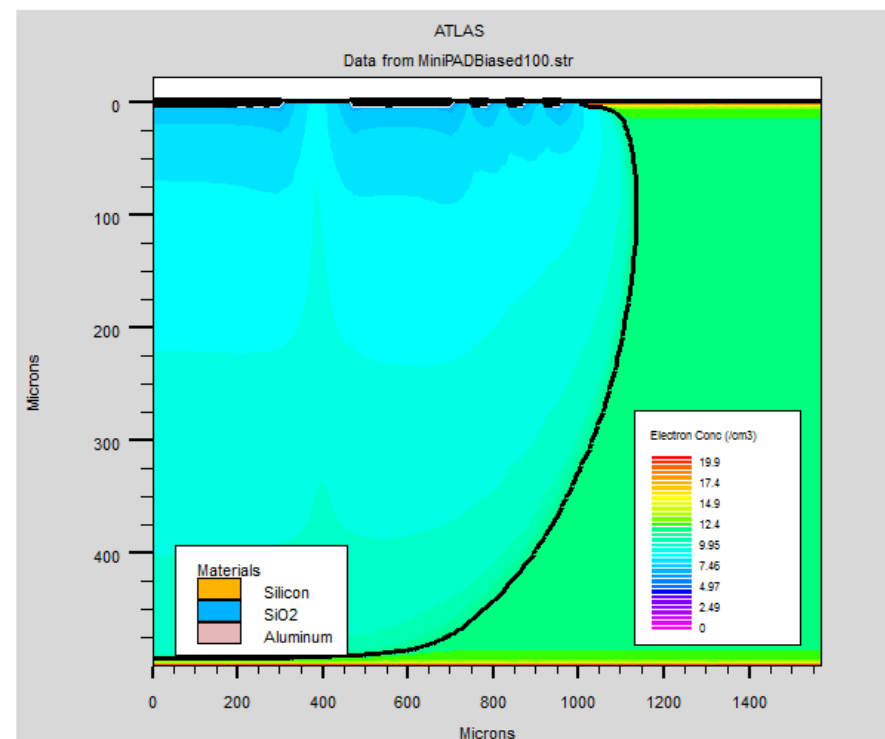
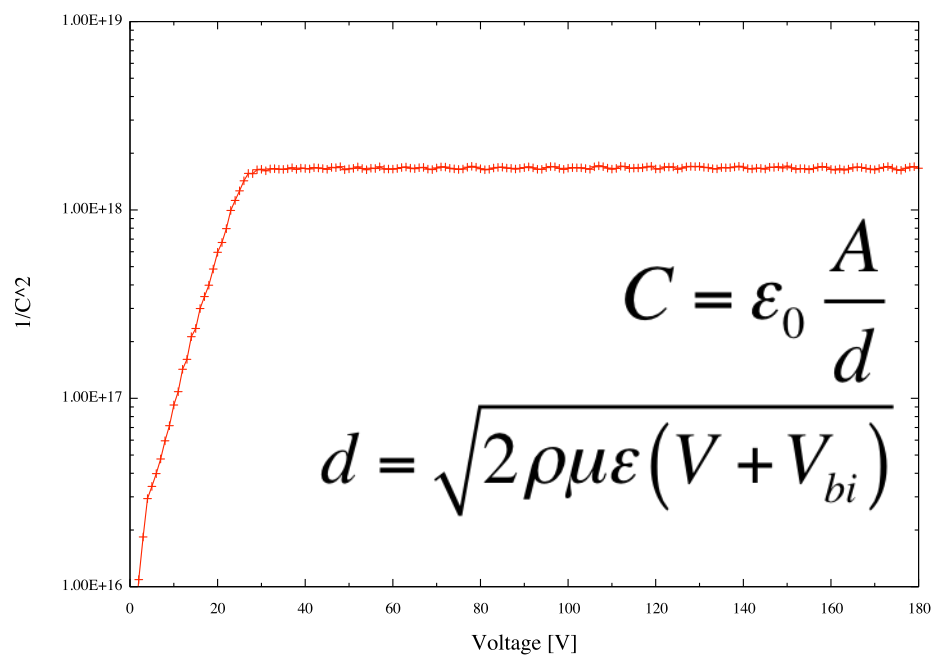
- CV test



80 V

Depletion volume

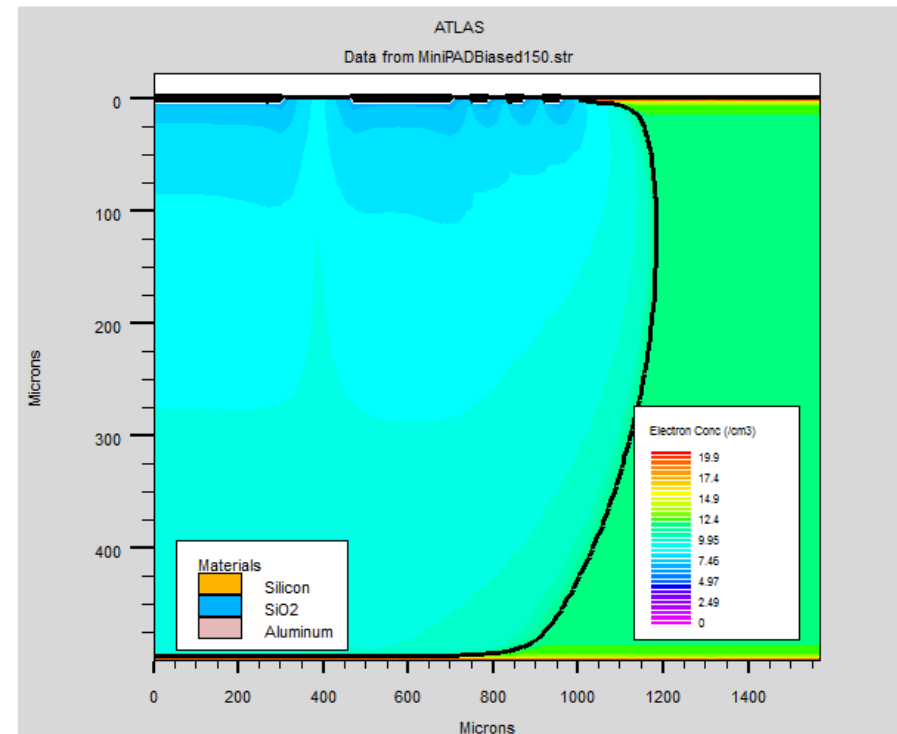
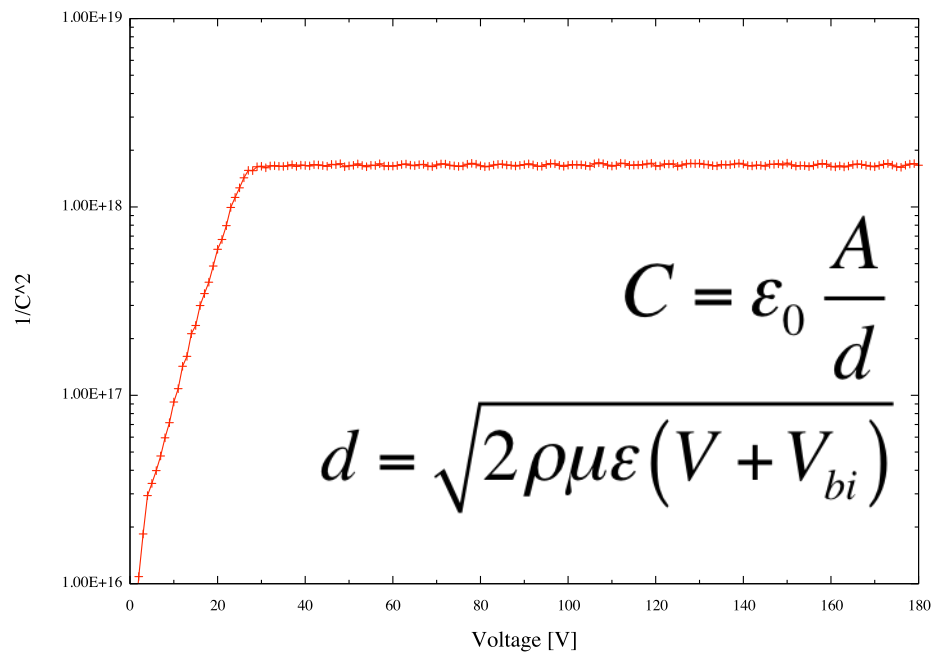
- CV test



100 V

Depletion volume

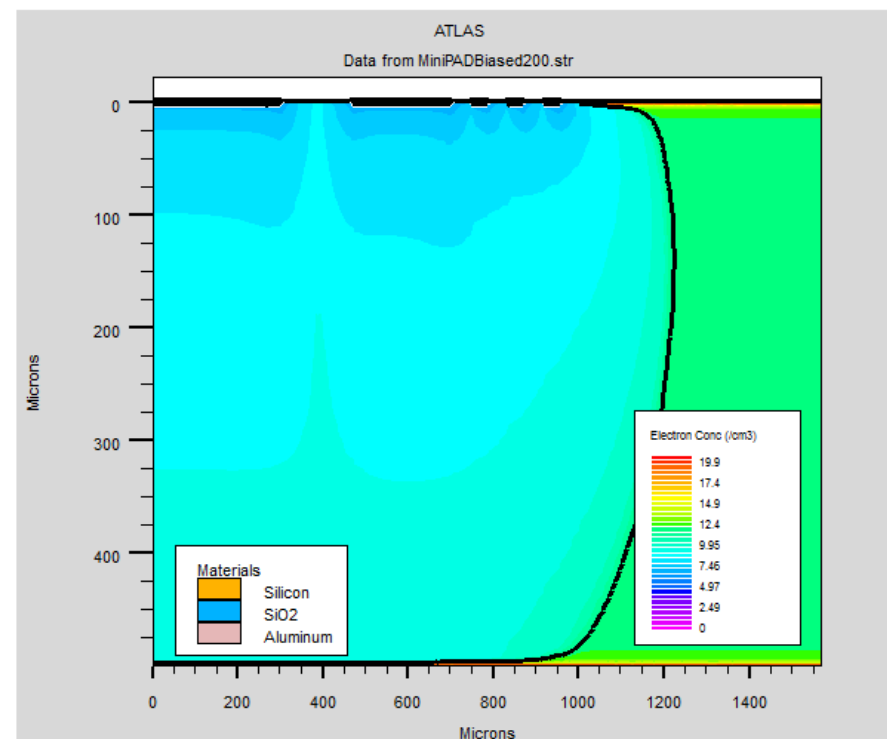
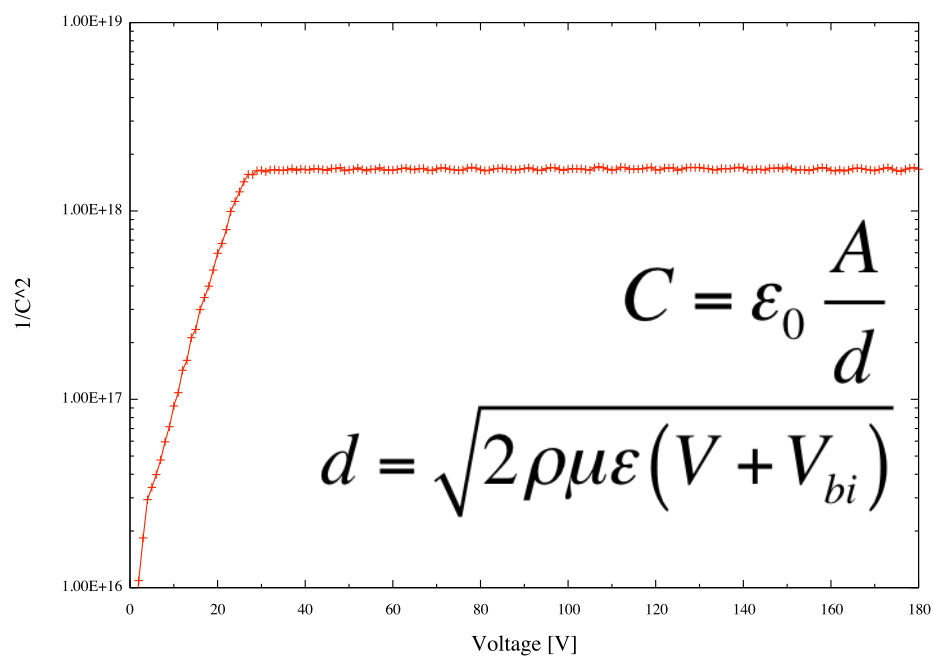
- CV test



150 V

Depletion volume

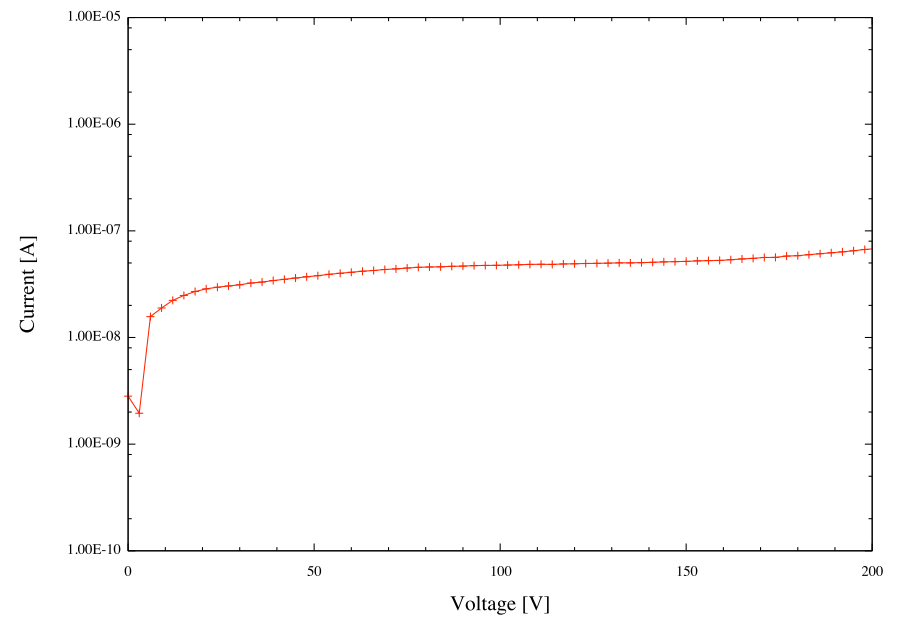
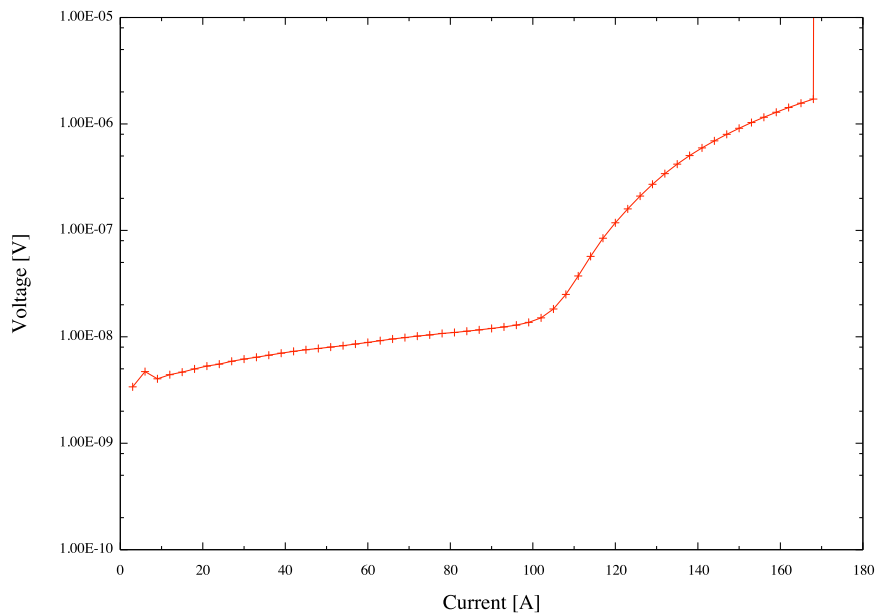
- CV test



200 V

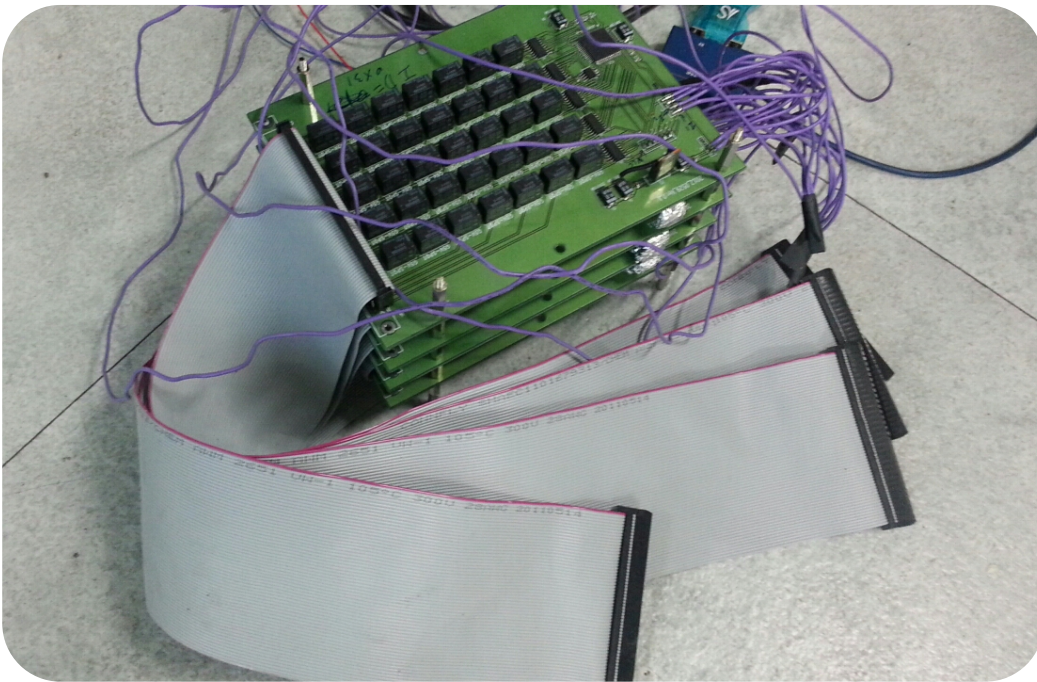
Process

- Overall quality



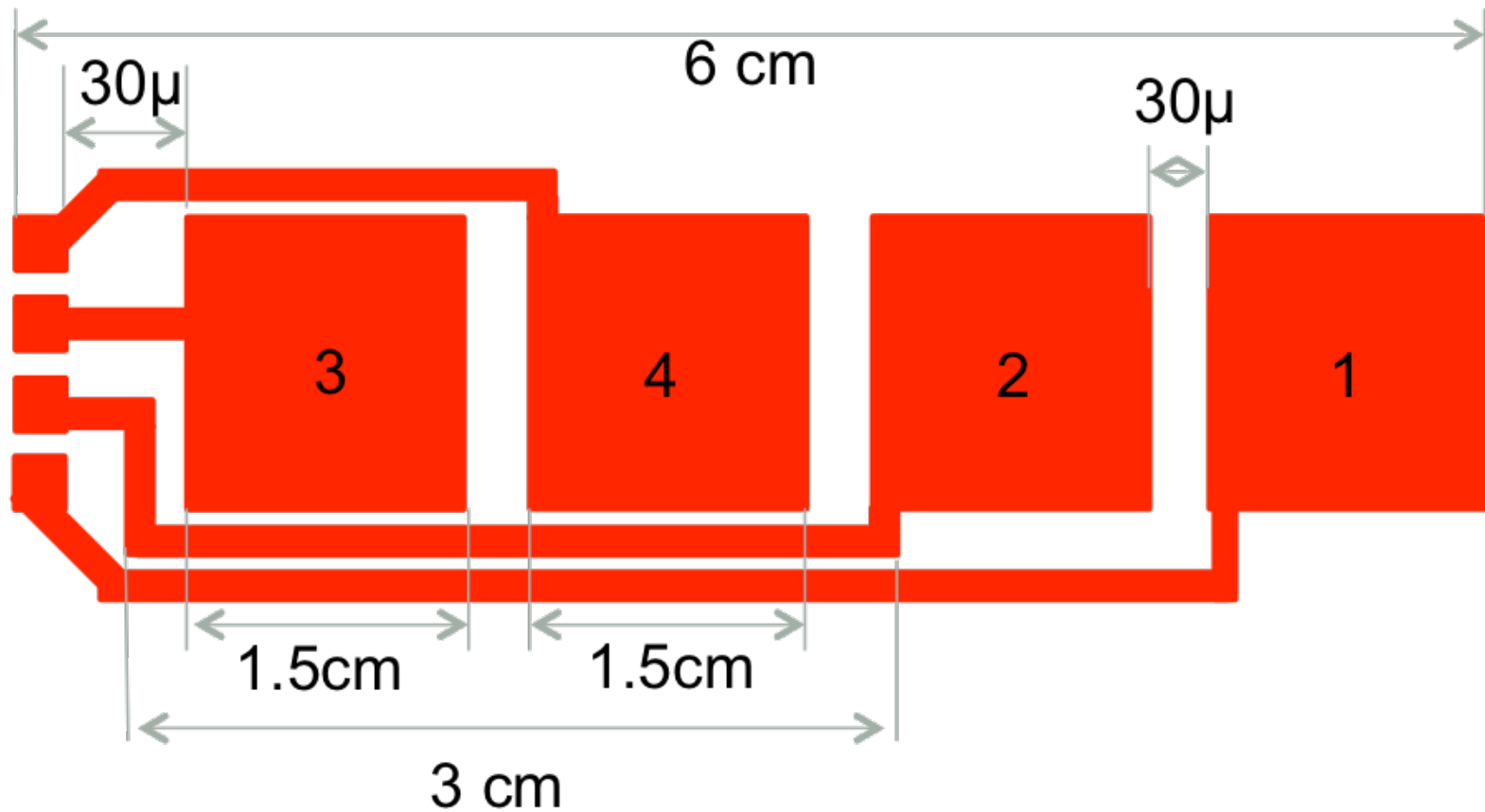
Metallization

- Short test

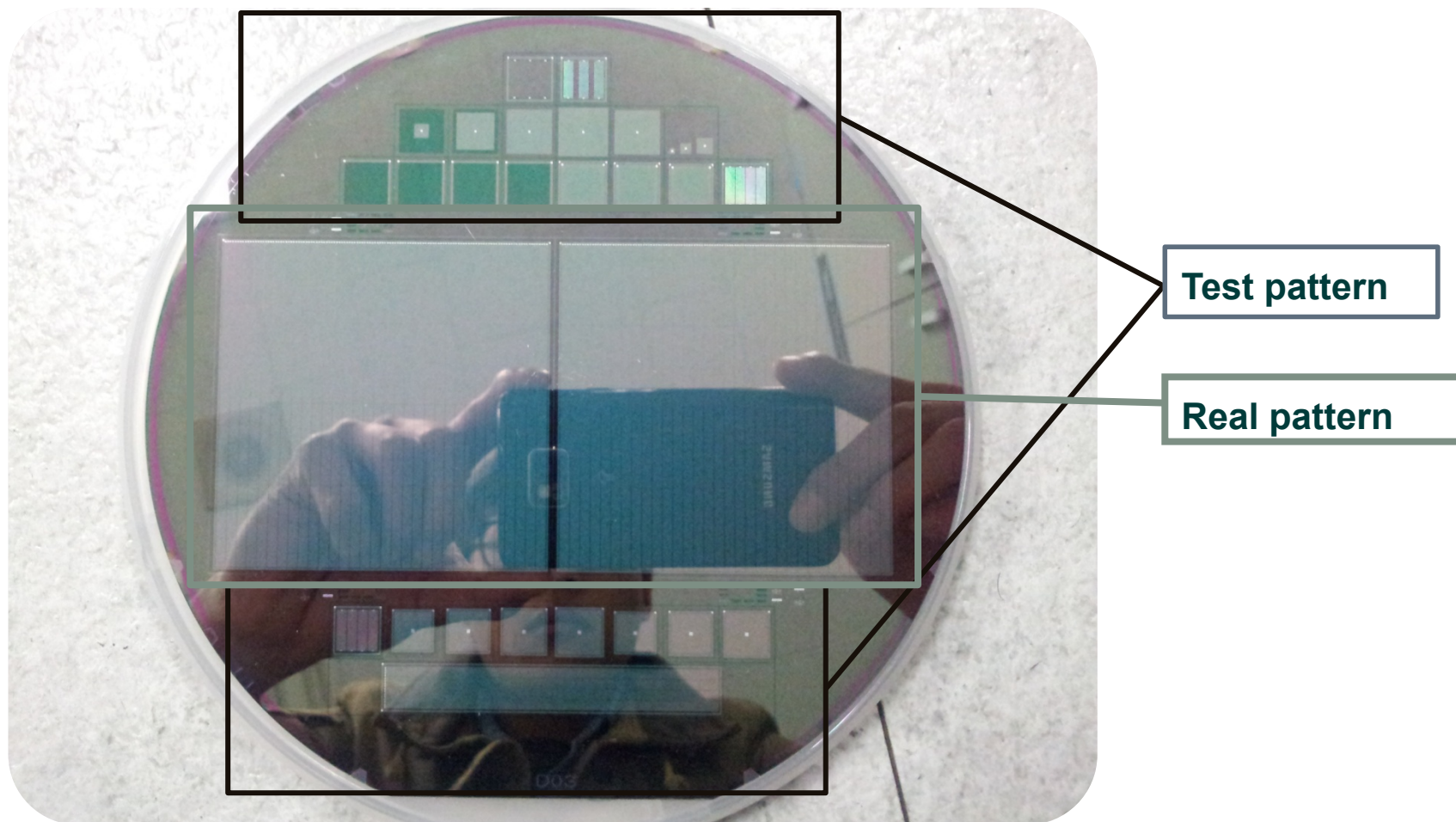


Metallization

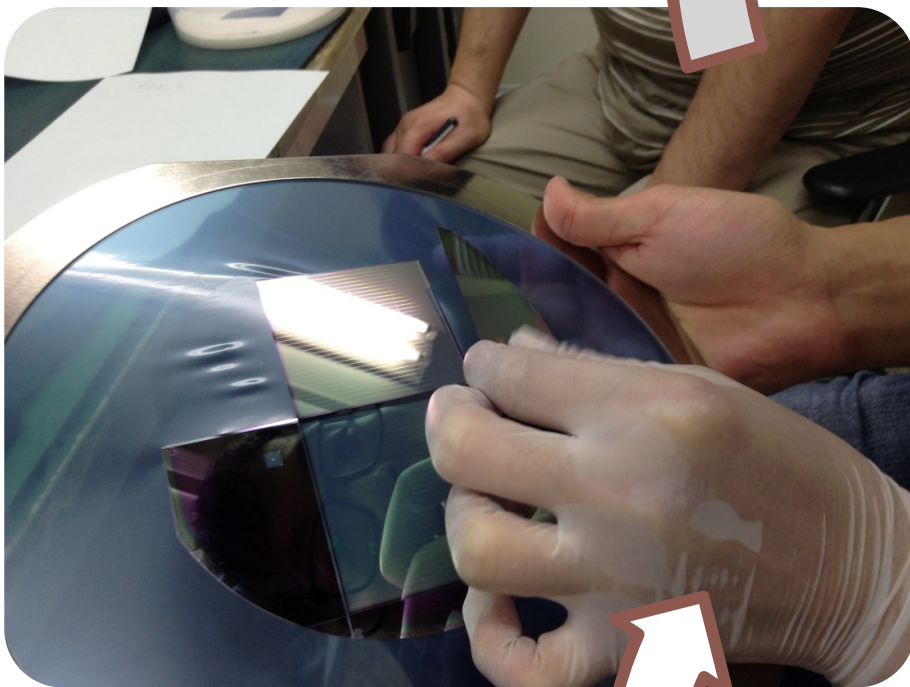
- Short test



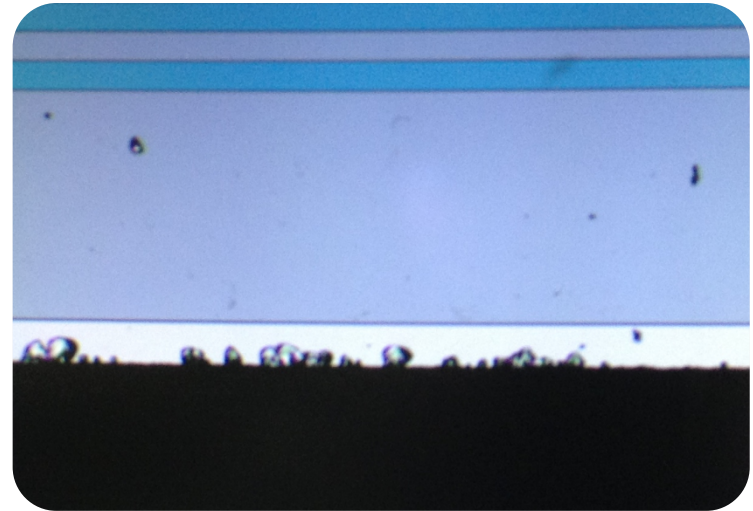
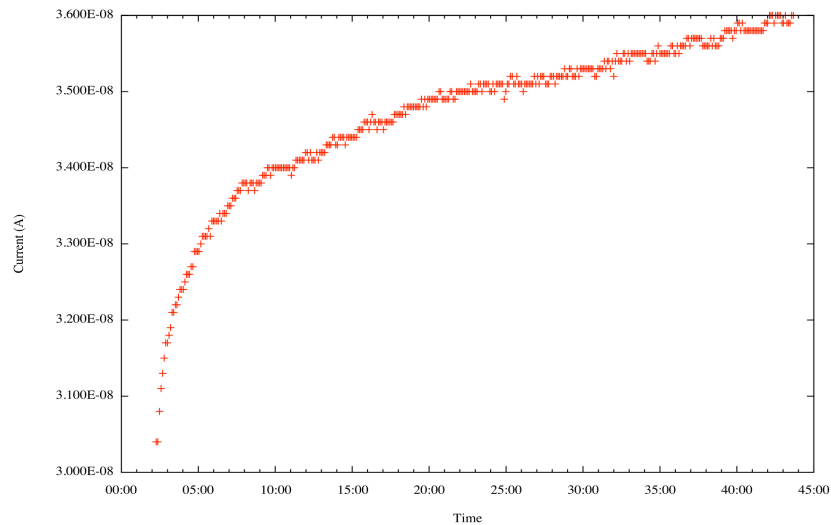
Wafer



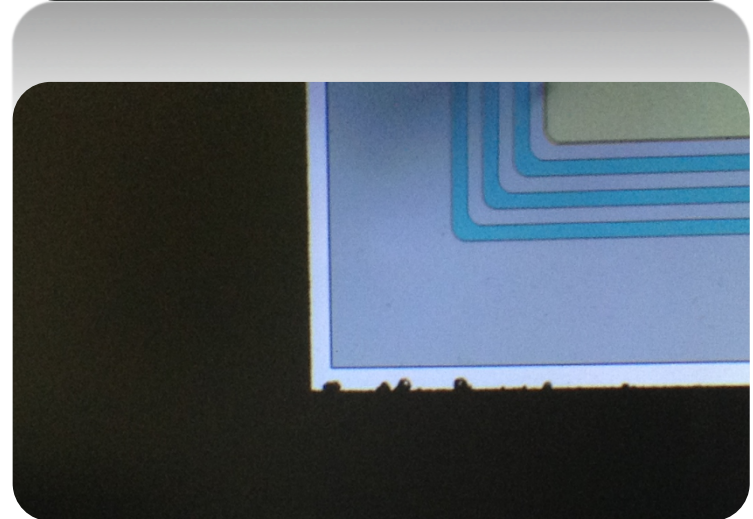
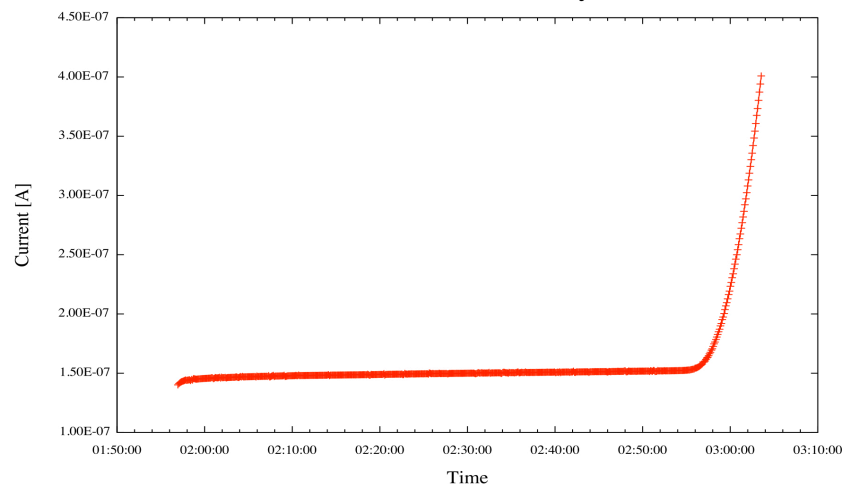
Diced sensor



Dicing Defect



E02L sensor stability



Problem Solving

- Reduce leakage current
- Good stability

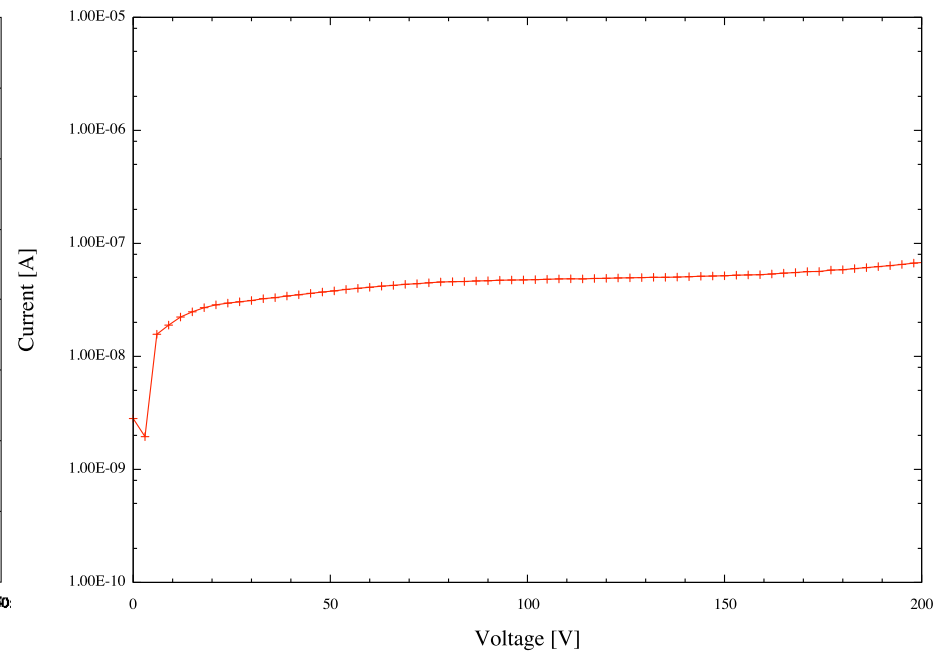
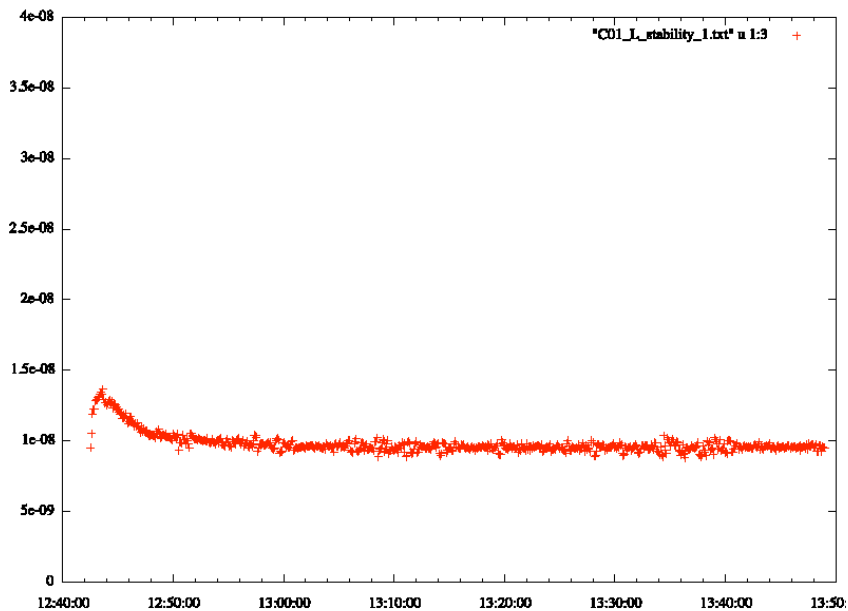
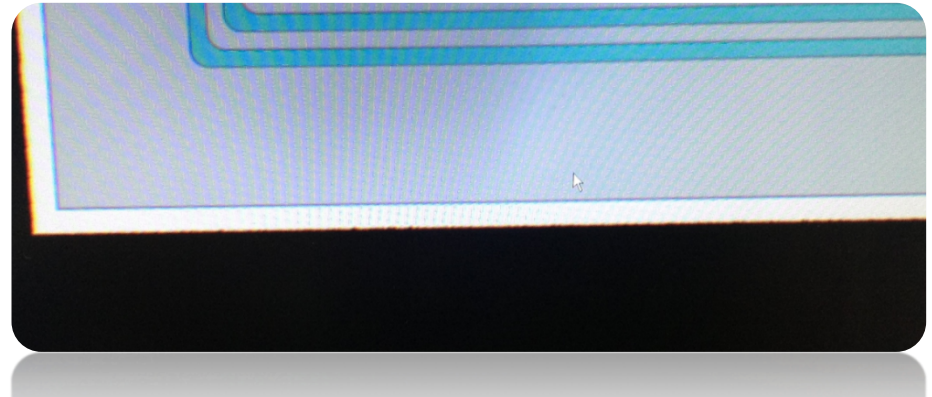


Photo response

- Response to ionizing radiation

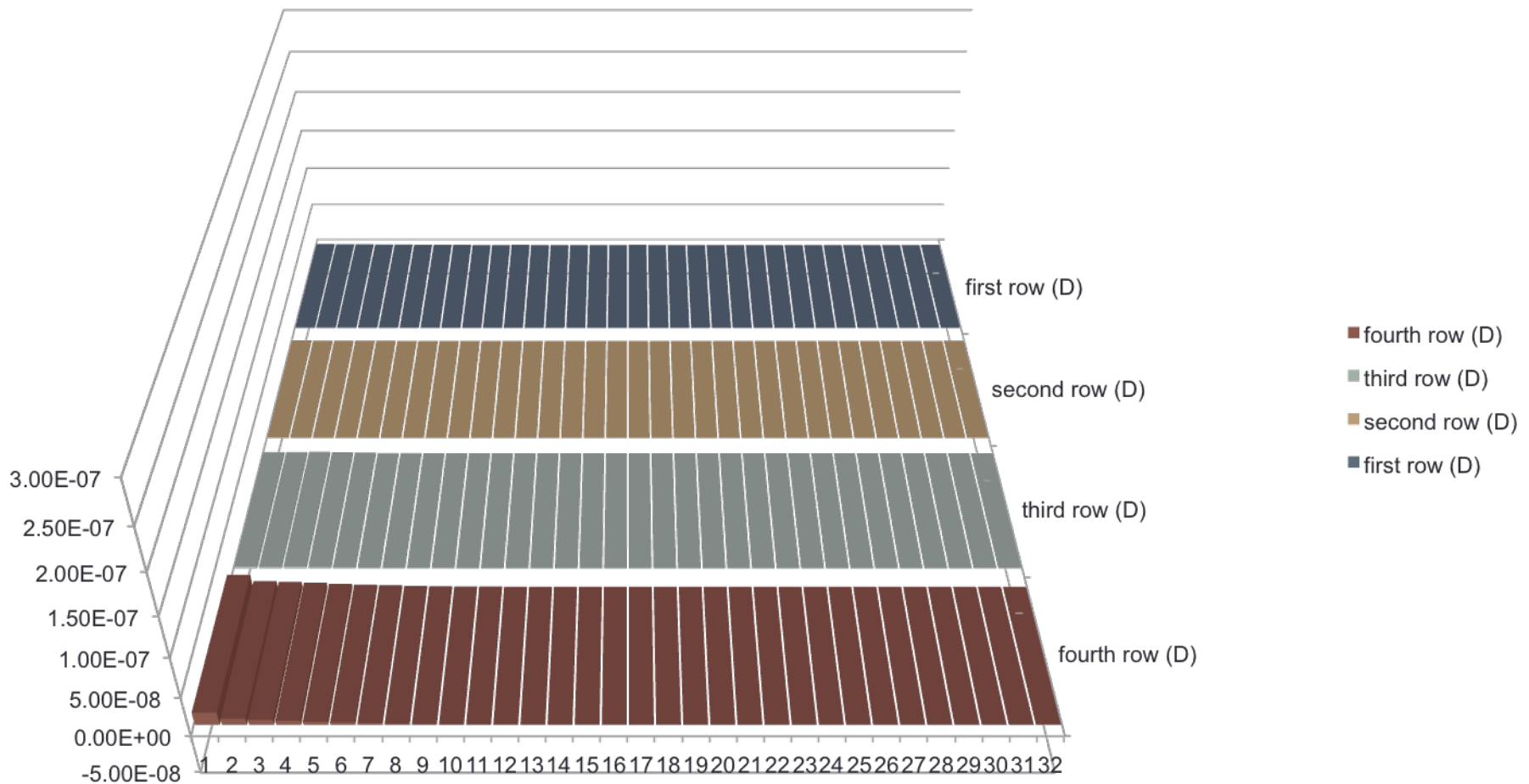
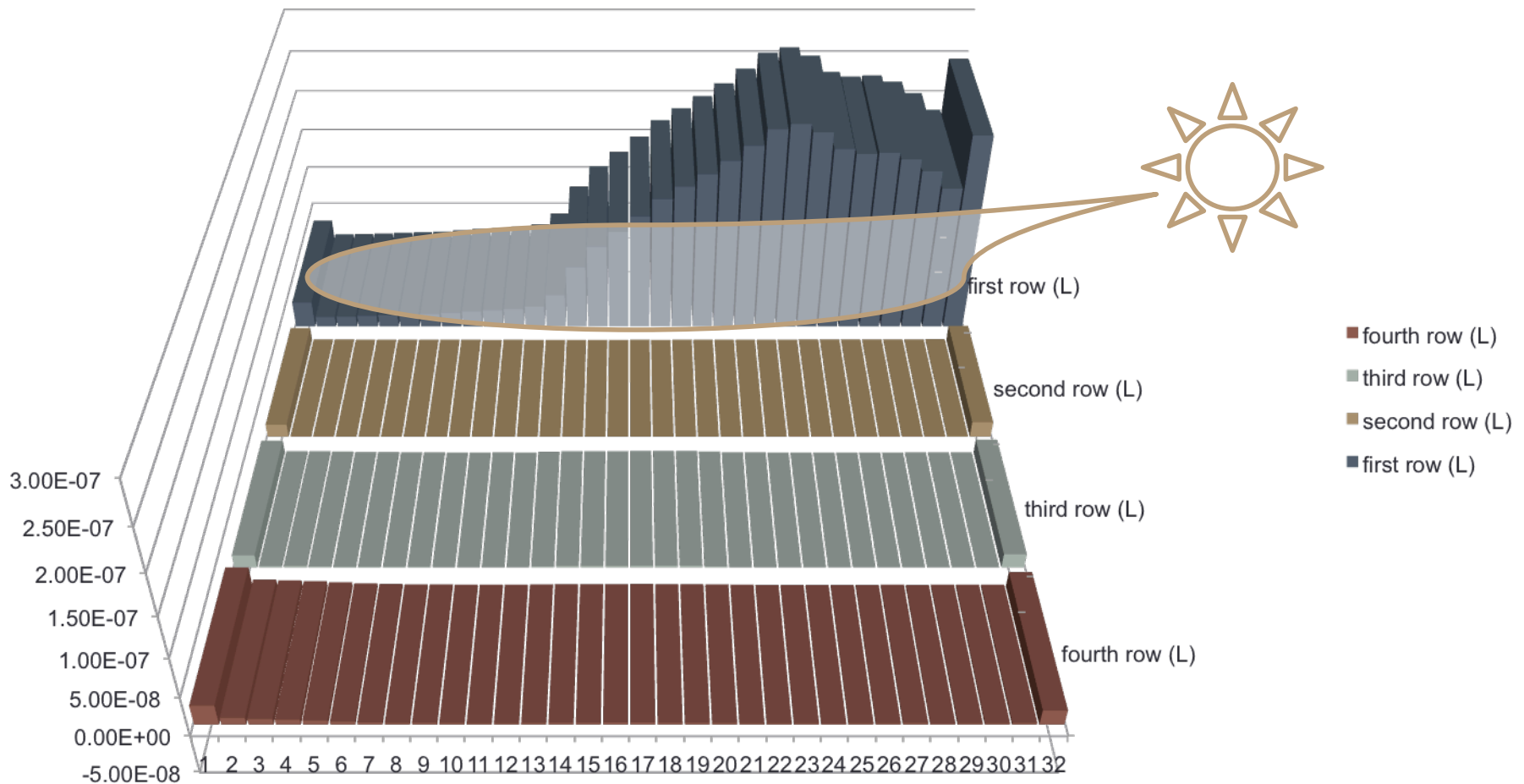


Photo response

- Response to ionizing radiation



Sensor Certification log

- CV test
- Before dicing
 - Short test
 - Guard ring & pattern leakage current test
- After dicing
 - Guard ring & pattern leakage current test
 - Stability : x3 of full depletion voltage (90V) & 2 hours

Summary

- Sensor fabrication is in good progress.
- First fabrication out is expected by the end of Nov.
- We define the sensor log procedures.