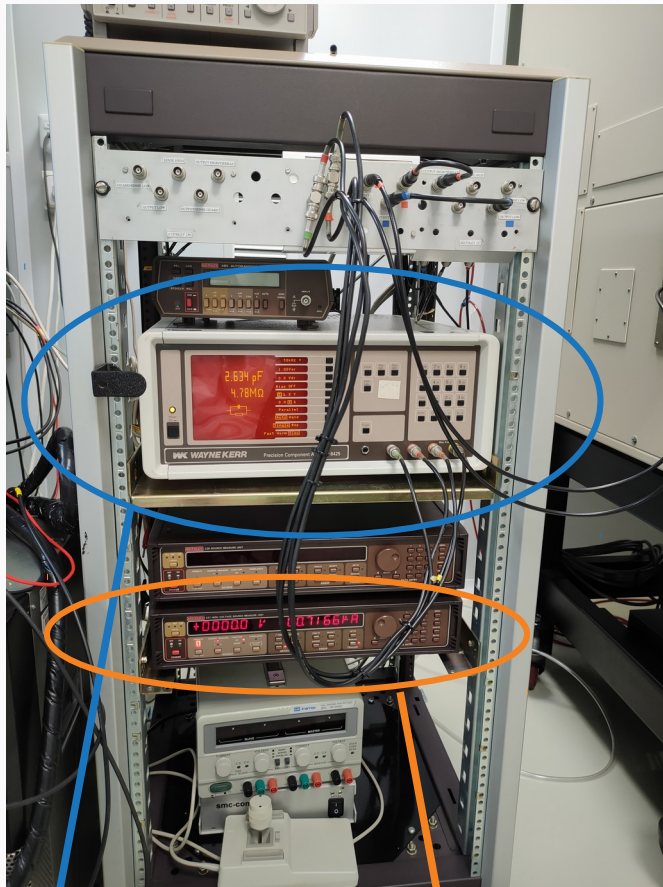


RD50-MPW2 C-V Measurements on test matrices at IFIC

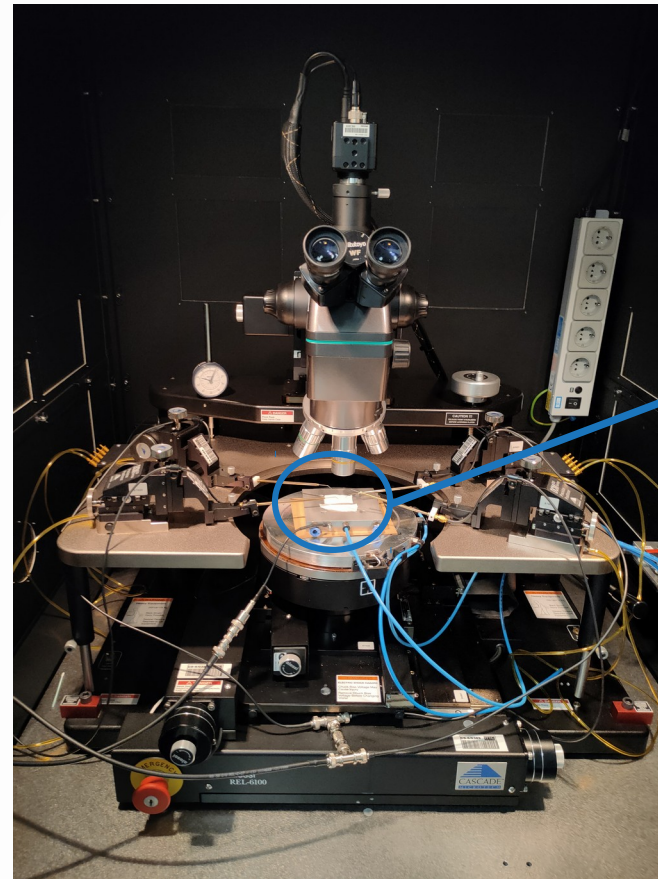
*Ana Catalán Benavent
Ricardo Marco Hernández
Carlos Mariñas Pardo
IFIC (CSIC-UV)*

RD50-MPW2 C-V measurements: setup

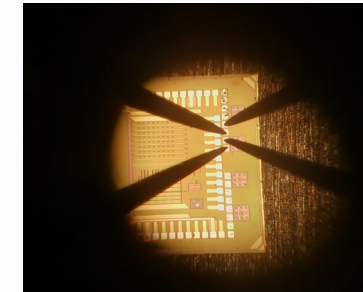


WAYNE KERR
(measure
Capacity)

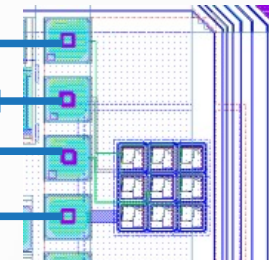
Keithley 237
source meter



- Setup inside a black box in
the clean room.



Ground
8 surrounding pixels
Central pixel
HV

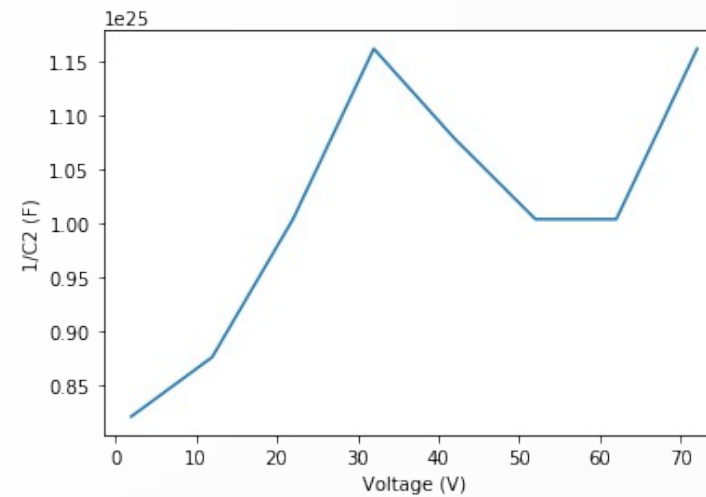
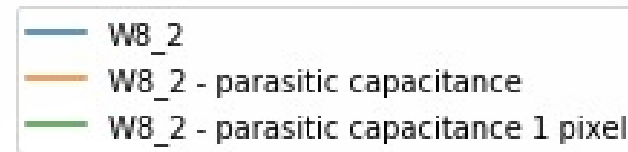
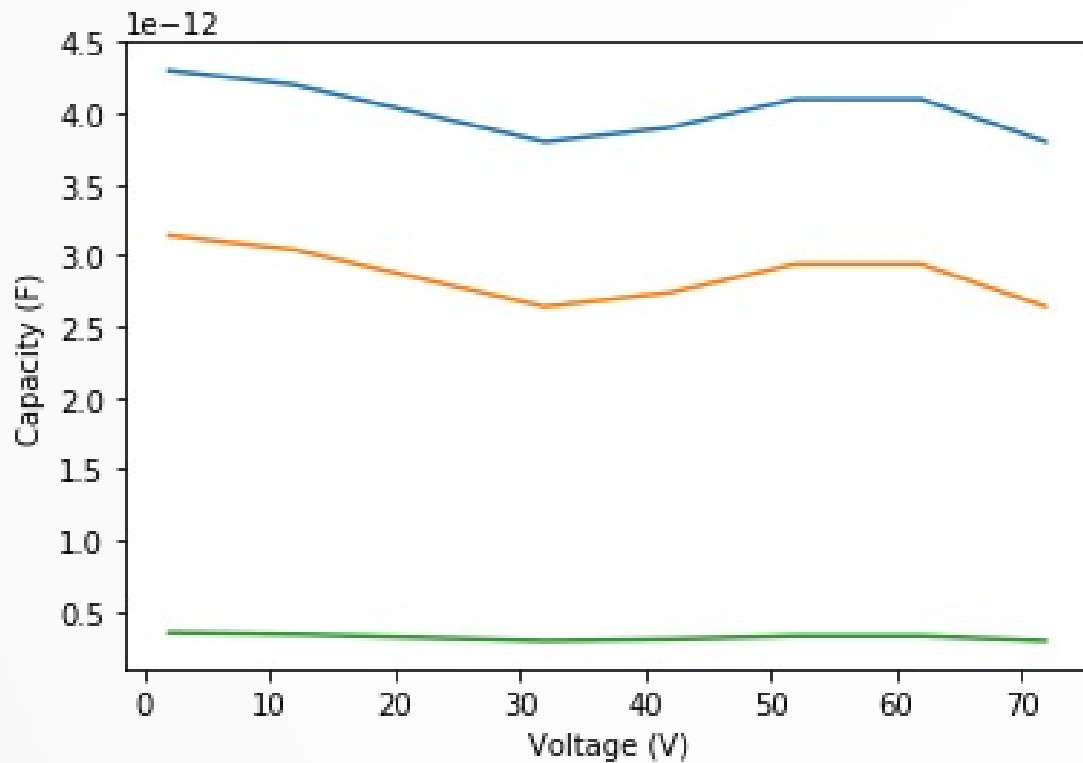


- GND, 8 surrounding pixels and
central pixel pads connected
together to GND.

- HV pad and chuck connected
together to HV.

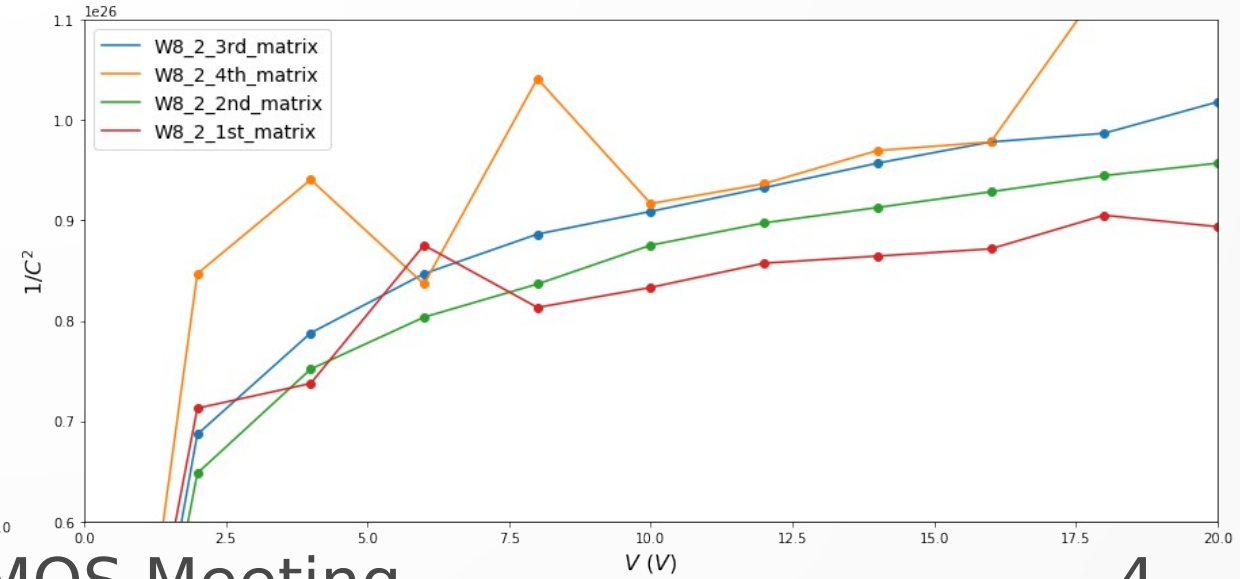
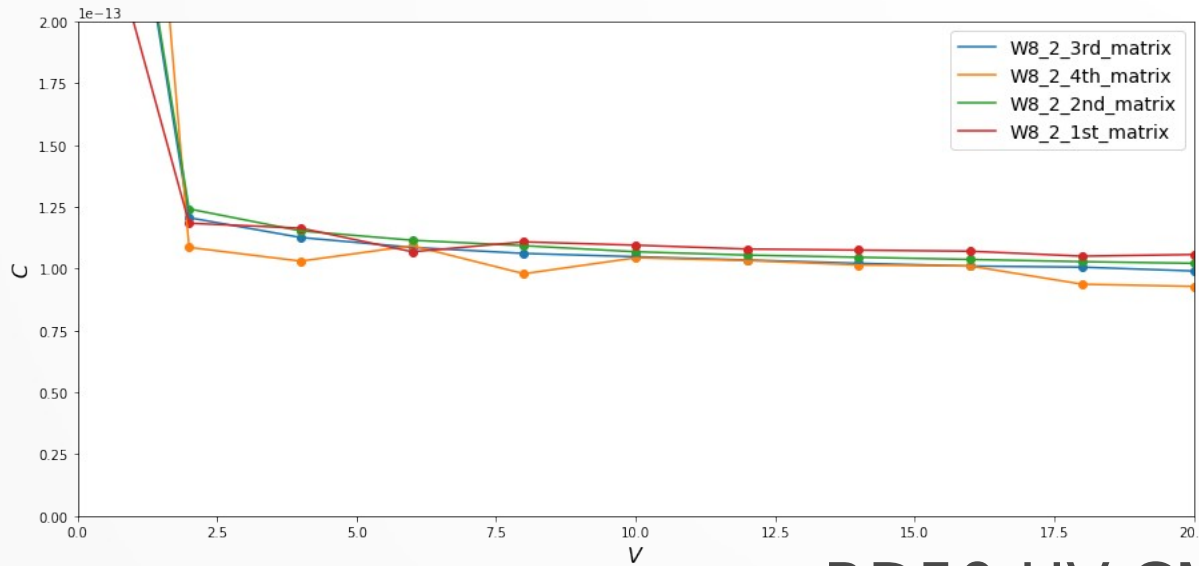
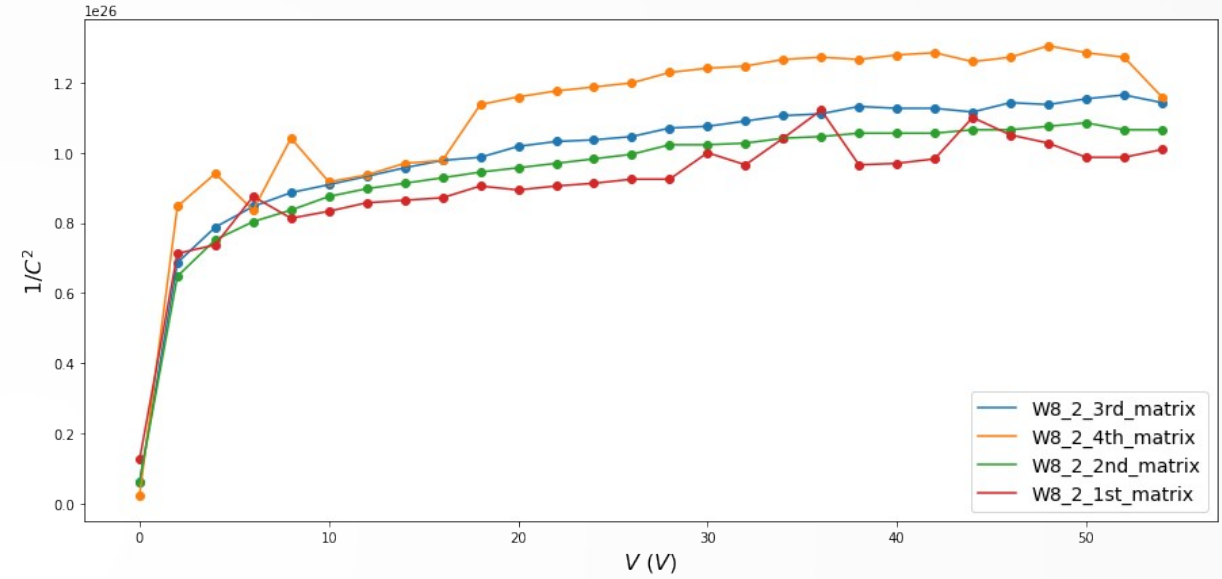
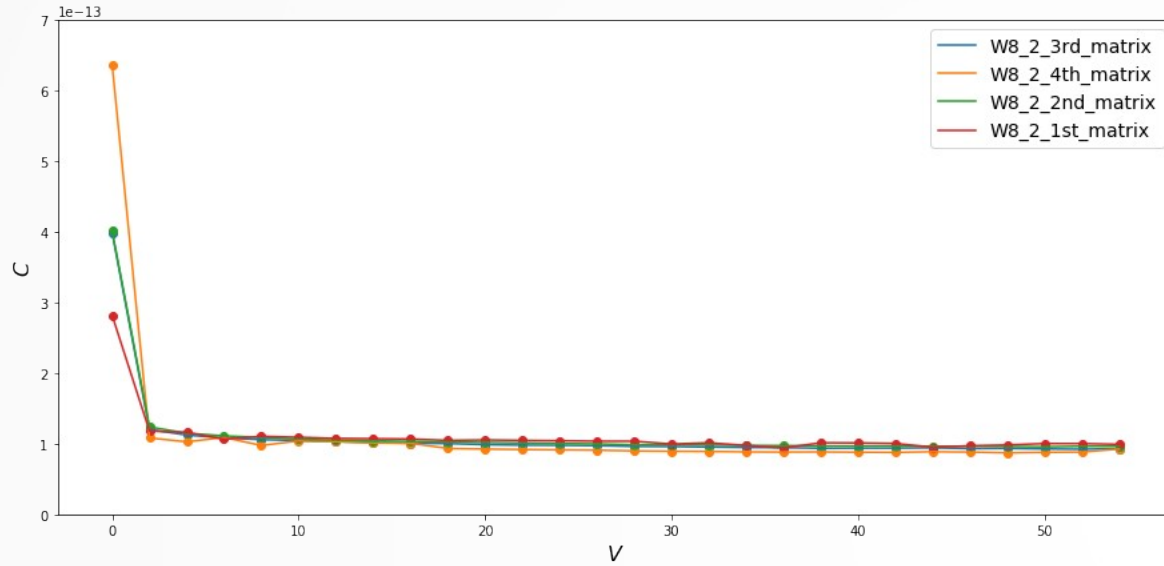
Capacitance calibration

- Measure the capacitance with the 4 needles connected but without touching the pads:
 $C \approx 1.2 \text{ pF}$
- Once we do the measurements, extract the parasitic capacitance (parallel) and divide by 9 (9 pixels connected in parallel).



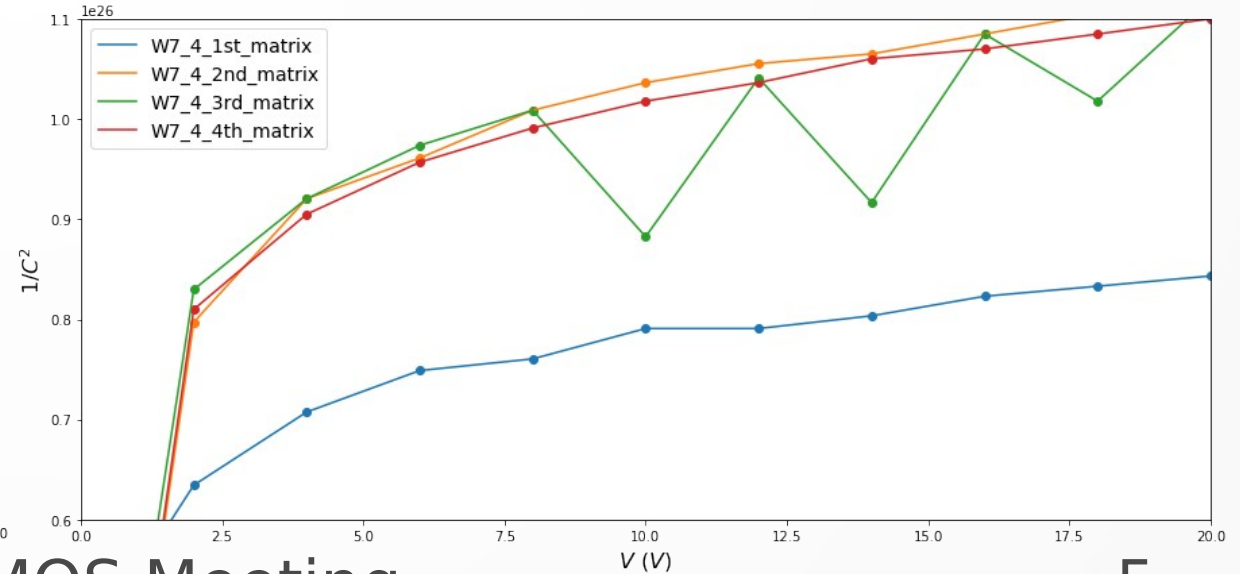
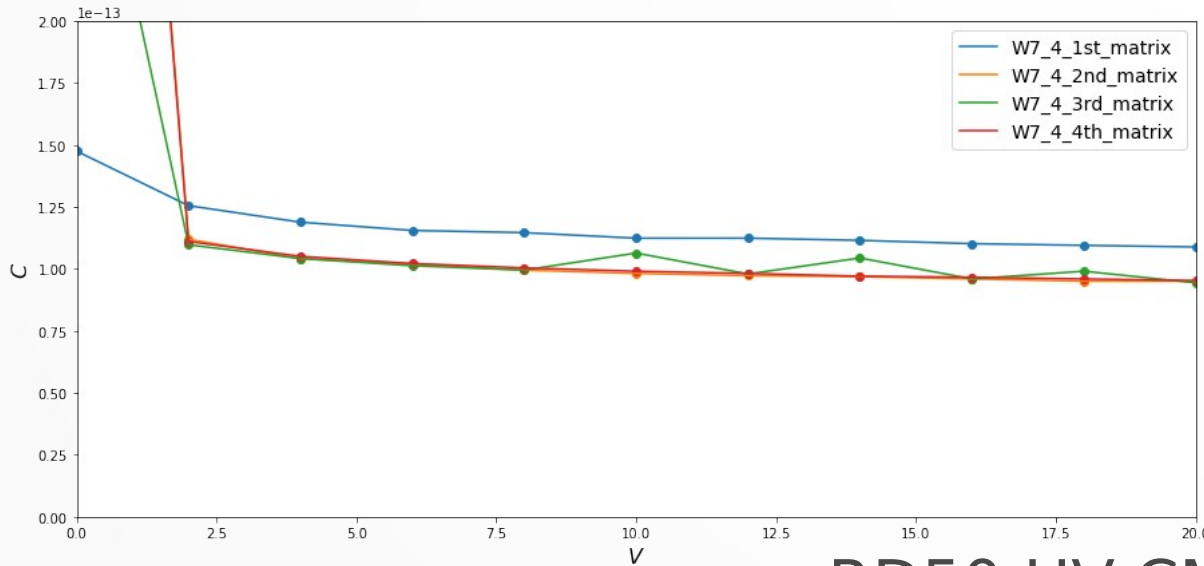
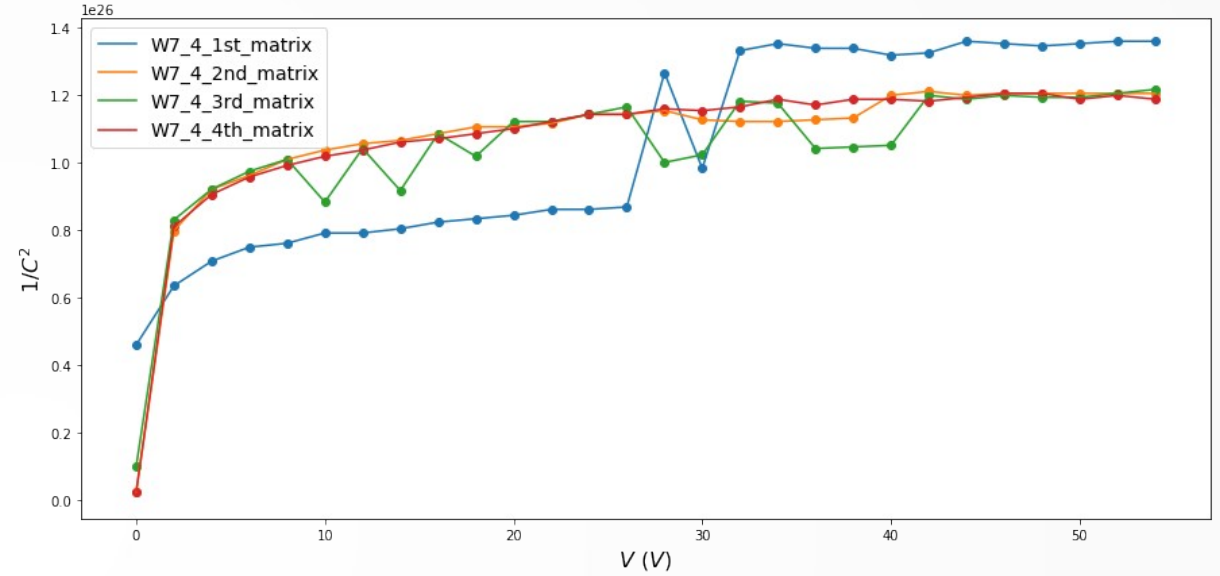
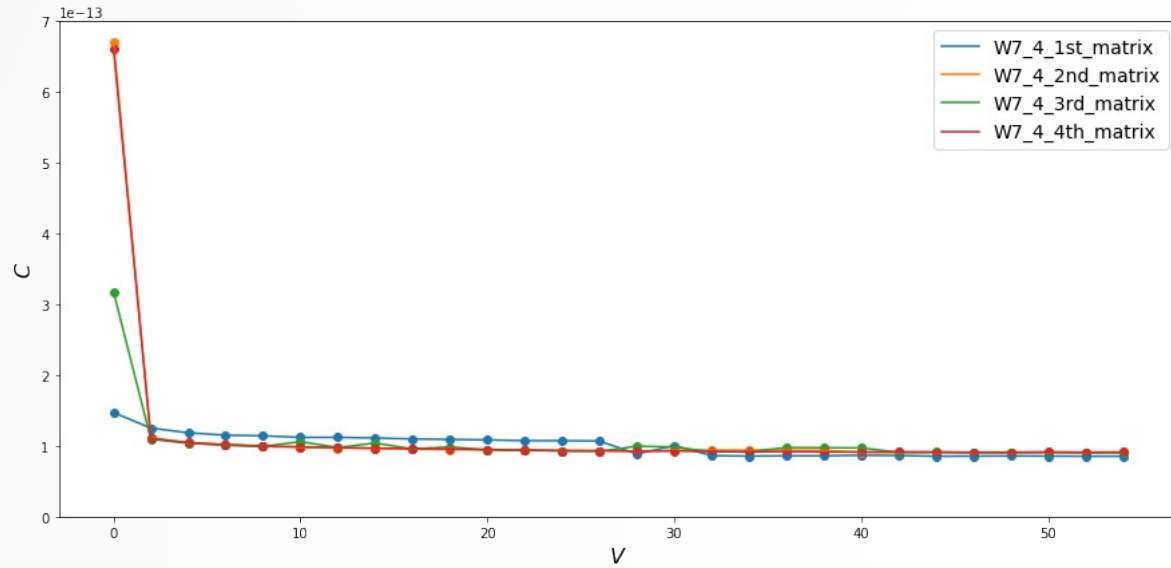
RD50-MPW2 C-V measurements

- C-V Measurements W8_2(0.5-1.1 kΩcm) every geometry:



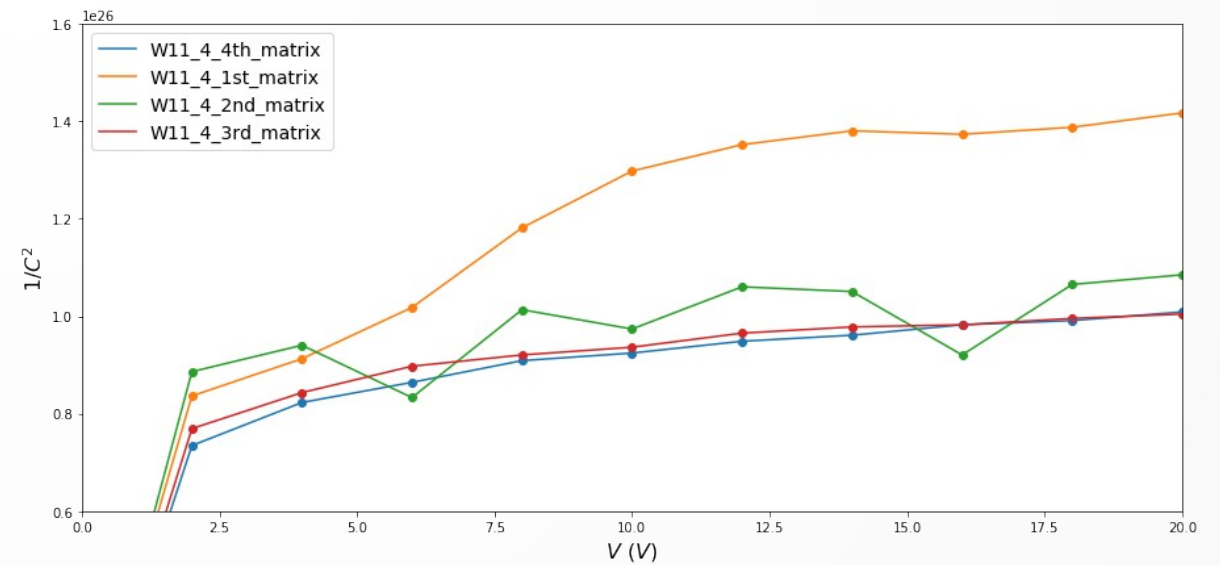
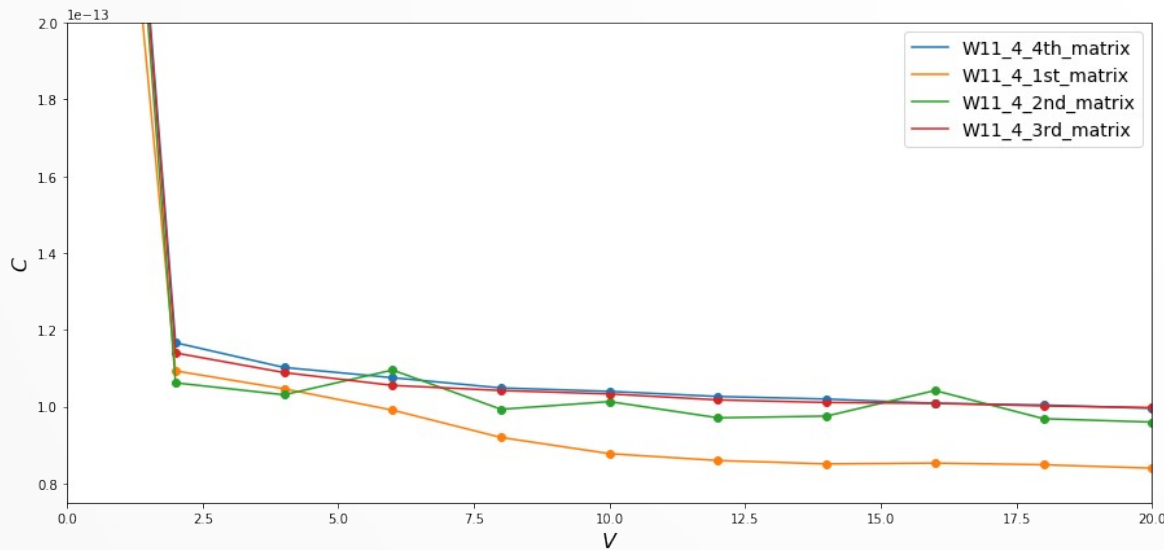
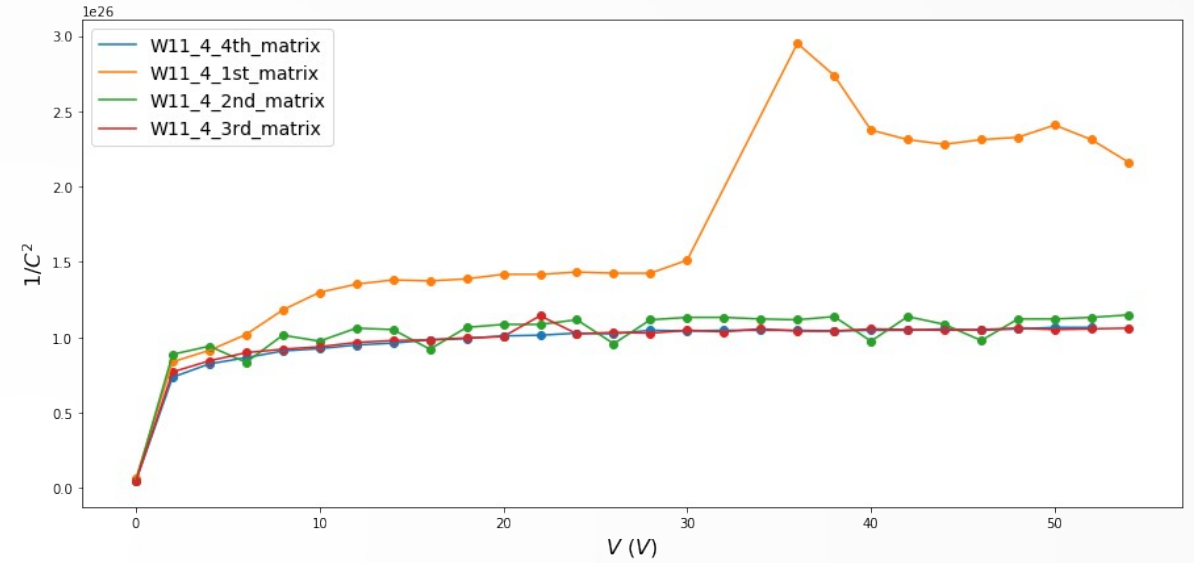
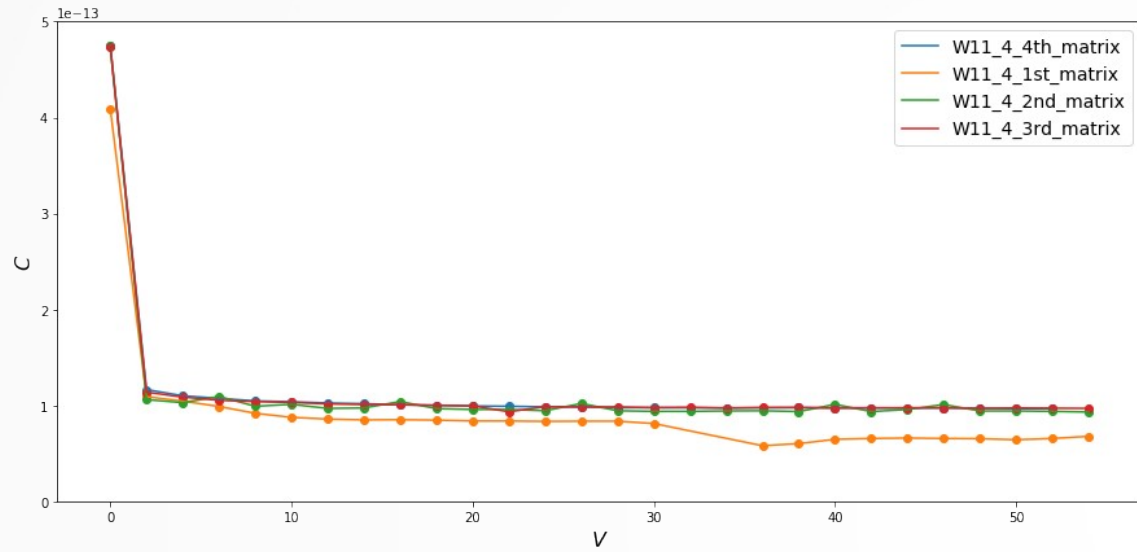
RD50-MPW2 C-V measurements

- C-V Measurements W7_4(0.5-1.1 kΩcm) every geometry:



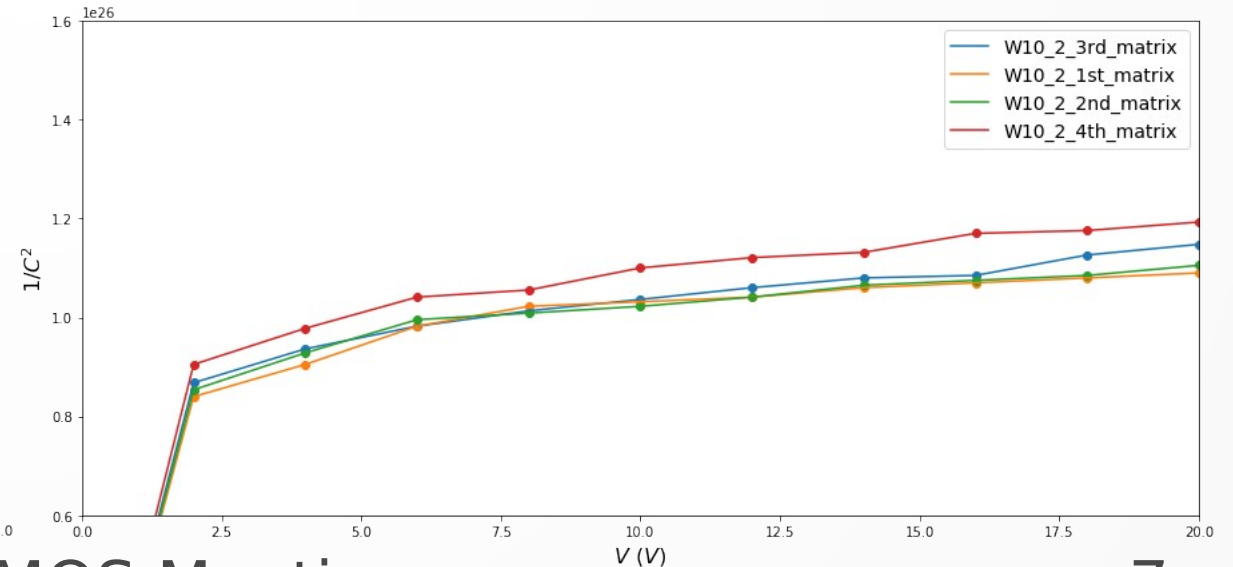
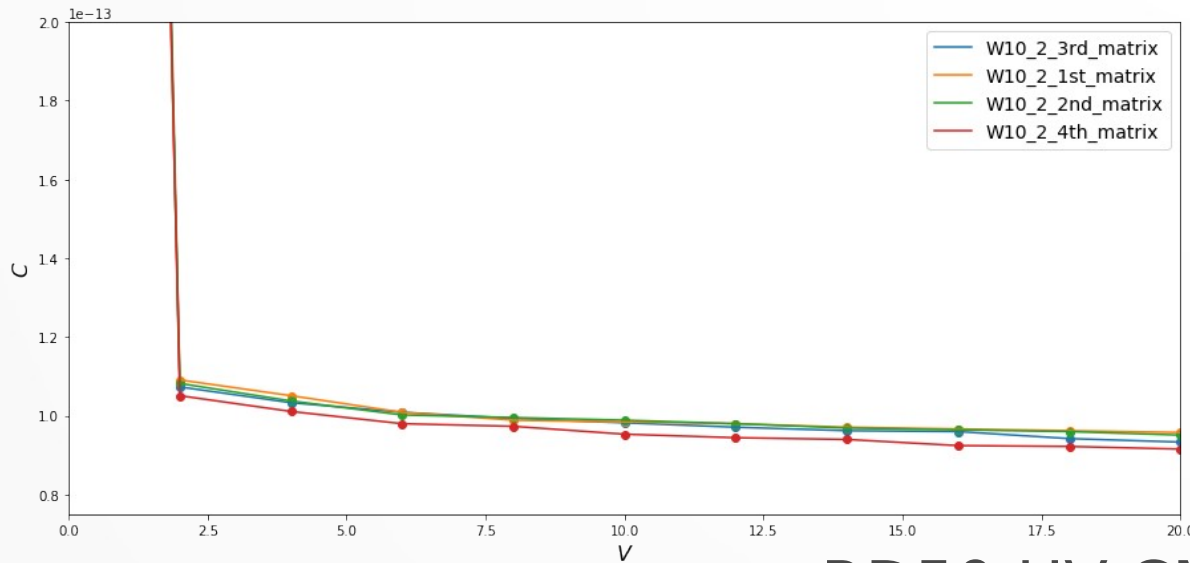
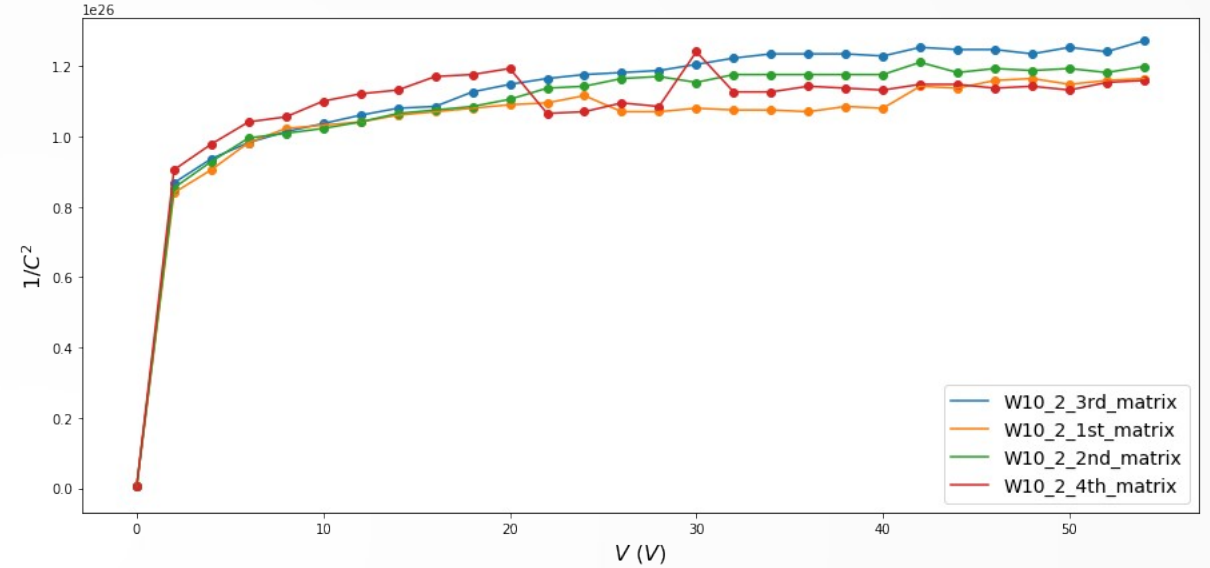
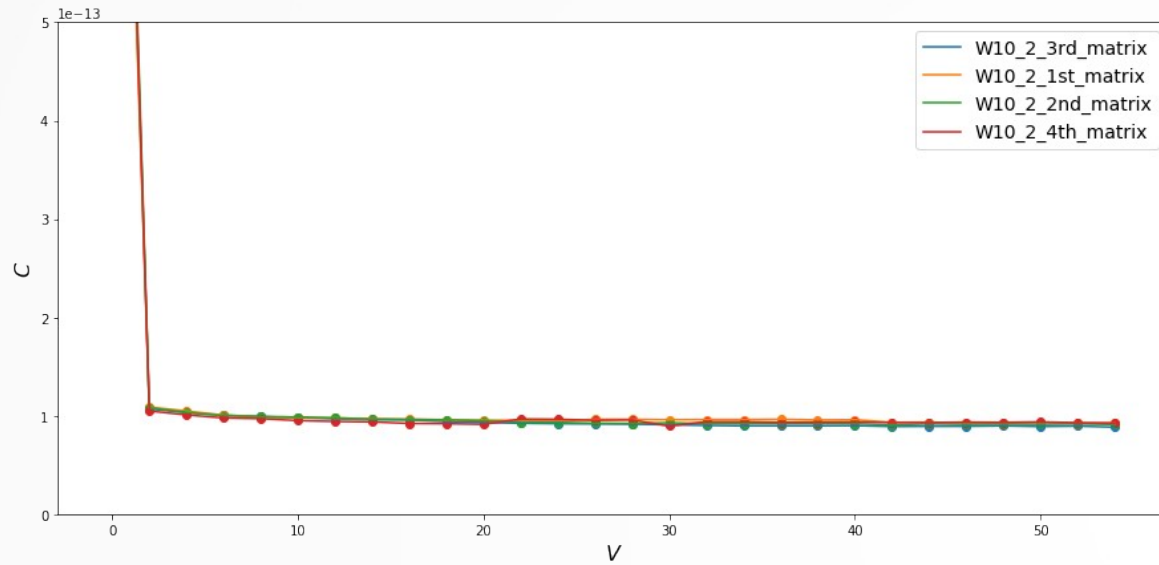
RD50-MPW2 C-V measurements

- C-V Measurements W11_4 (1.9 kΩcm) every geometry:



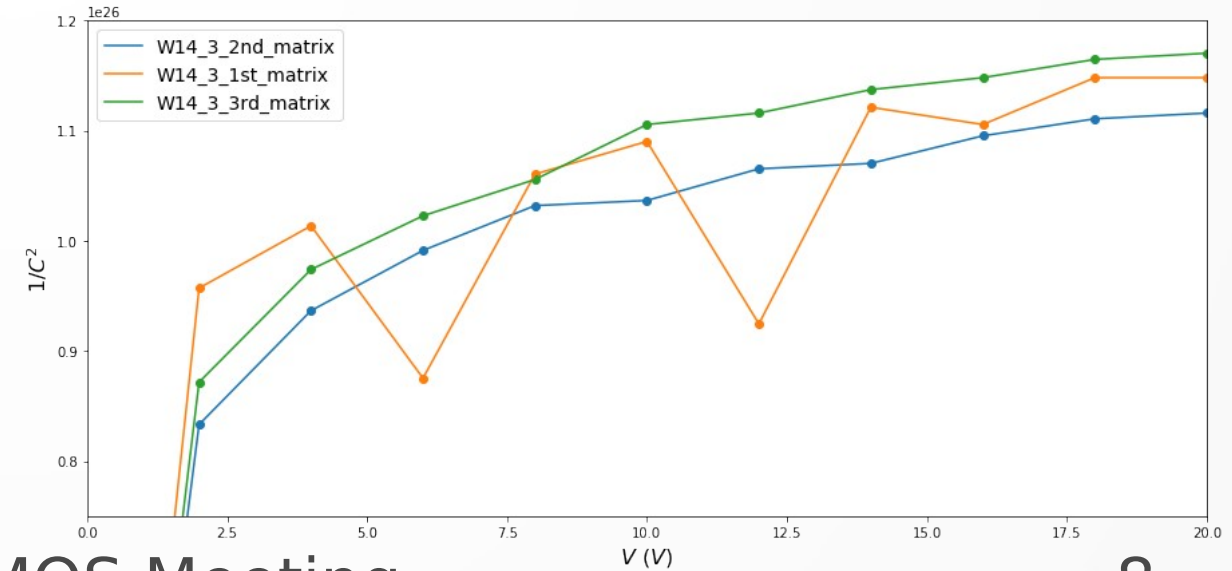
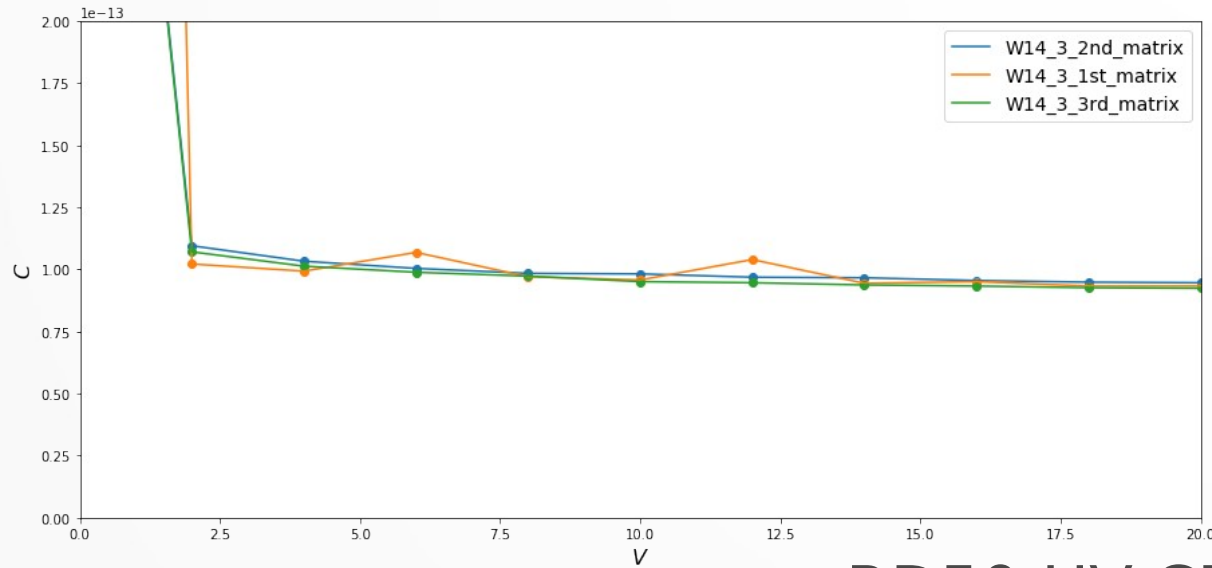
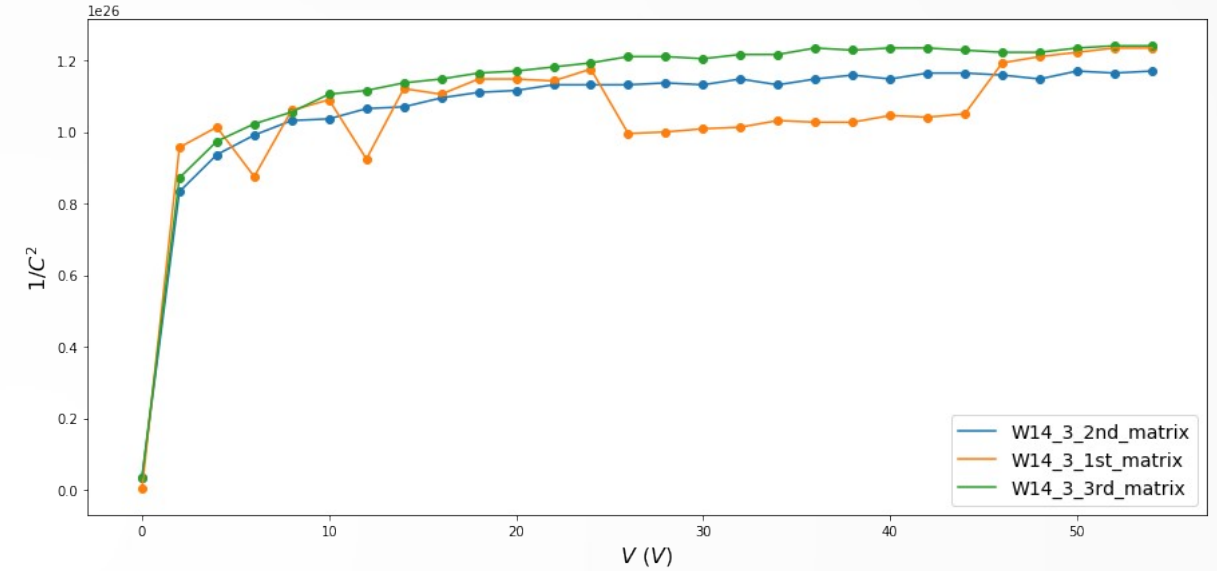
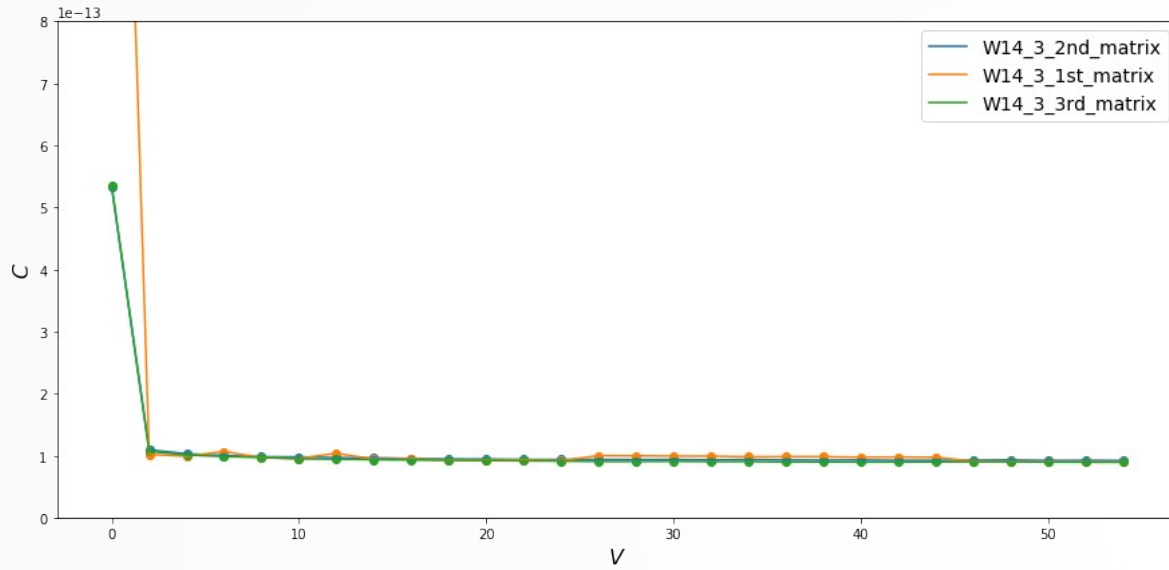
RD50-MPW2 C-V measurements

- C-V Measurements W10_2(1.9 kΩcm) every geometry:



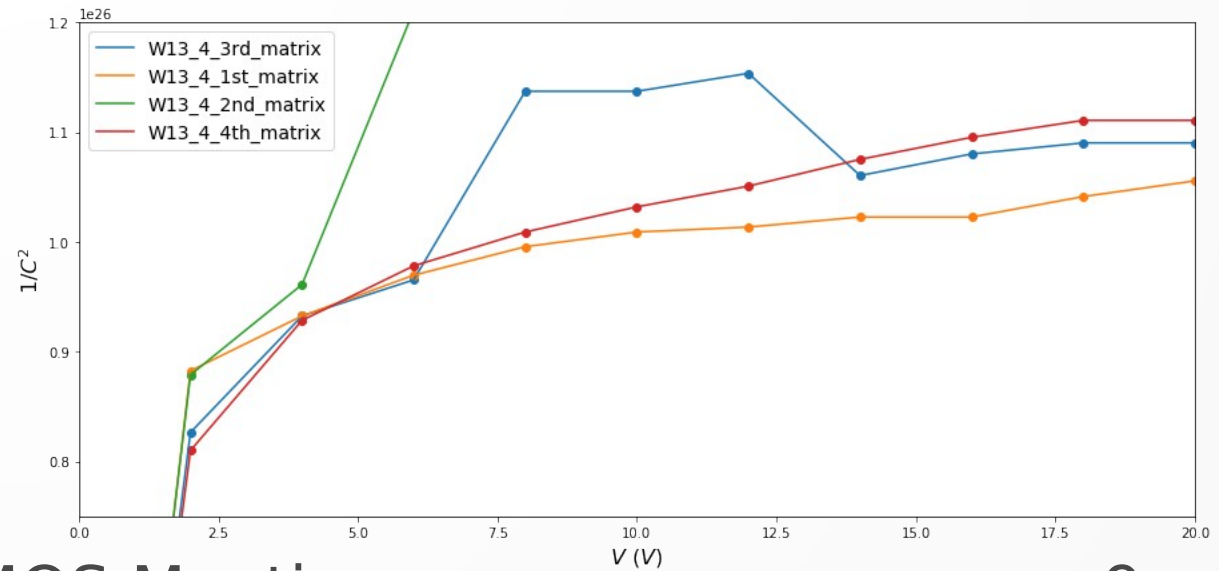
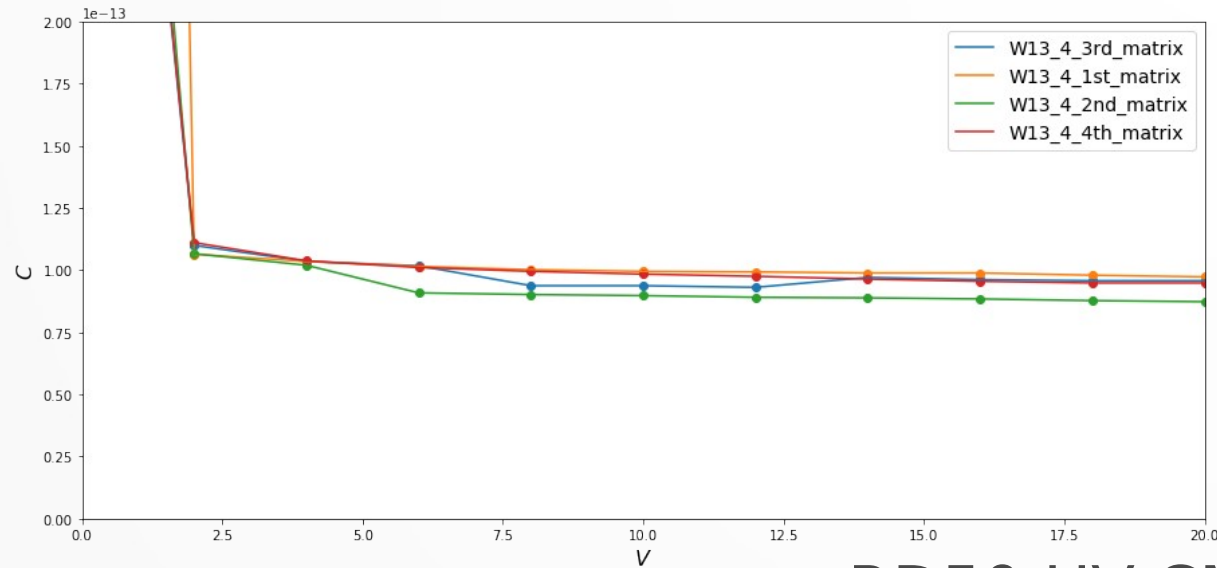
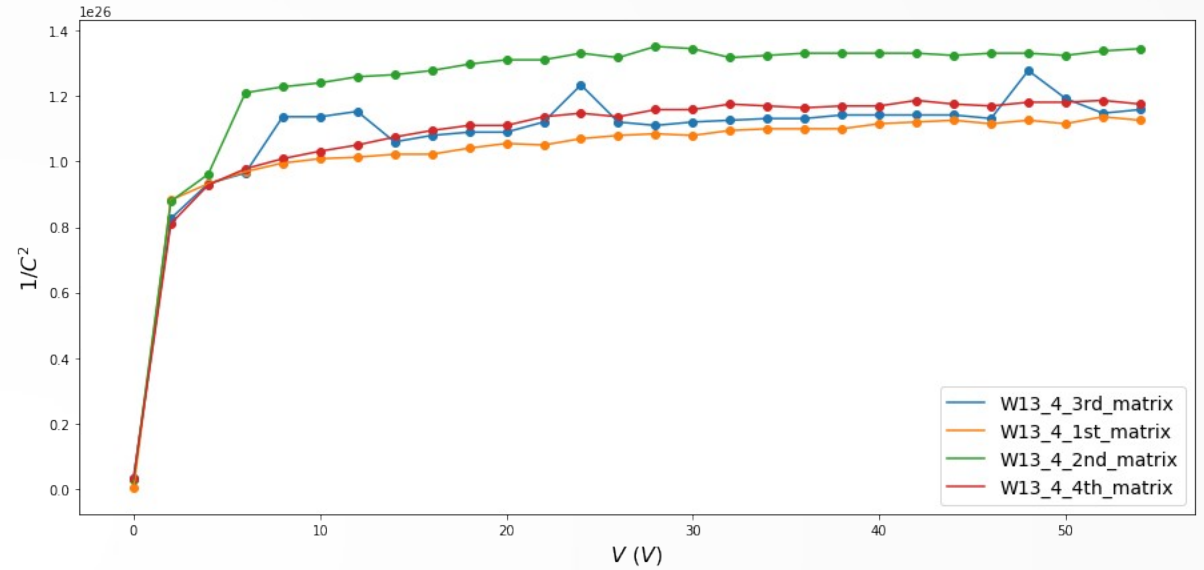
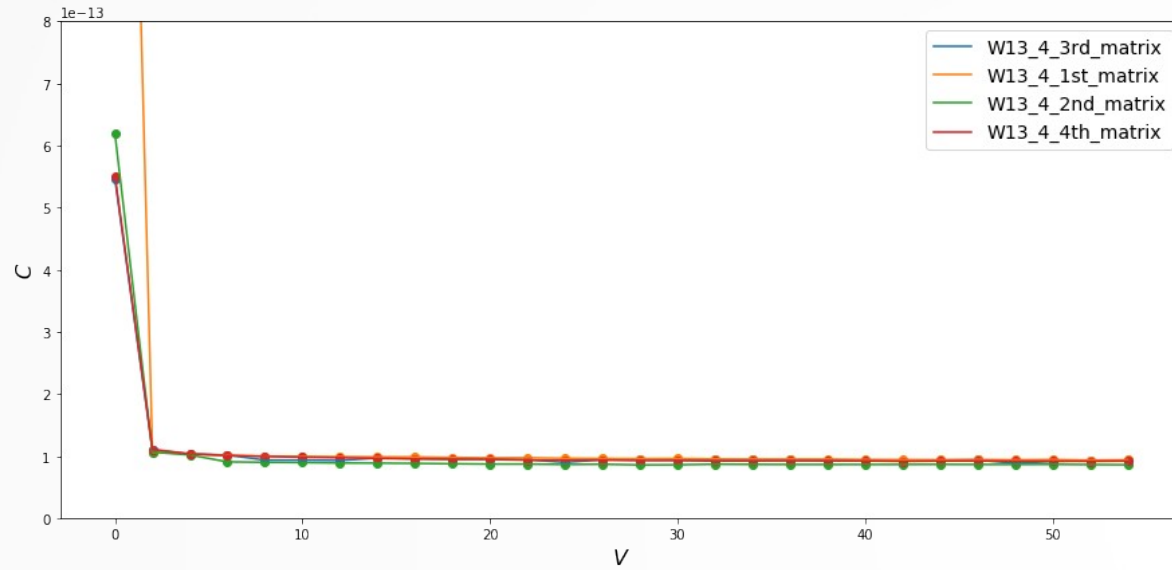
RD50-MPW2 C-V measurements

- C-V Measurements W14_3(> 2 kΩcm) every geometry:



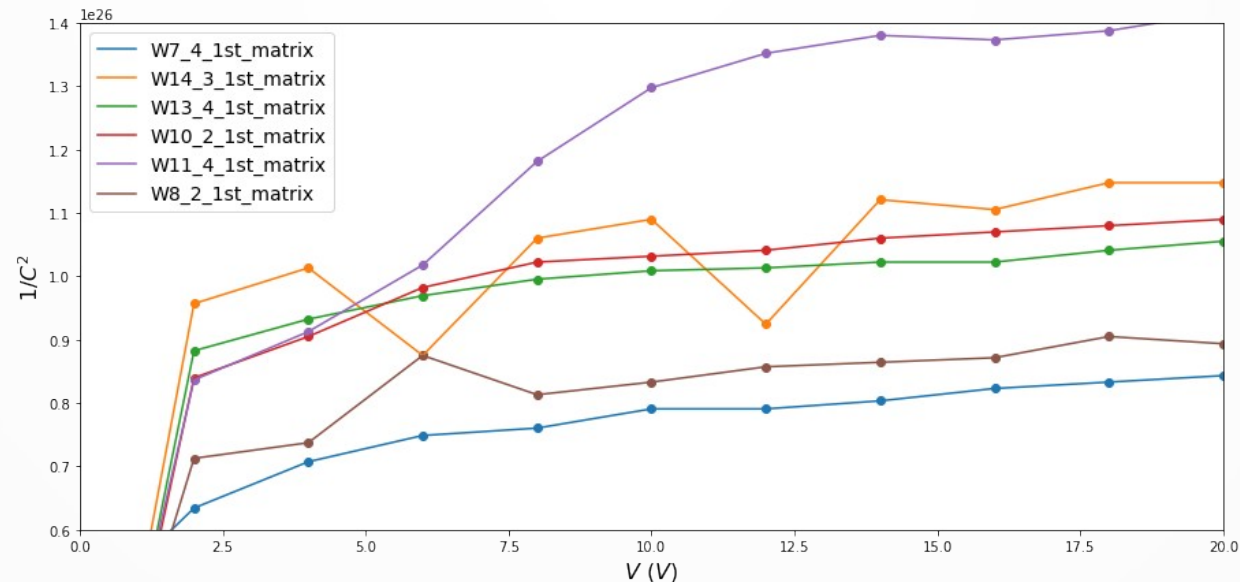
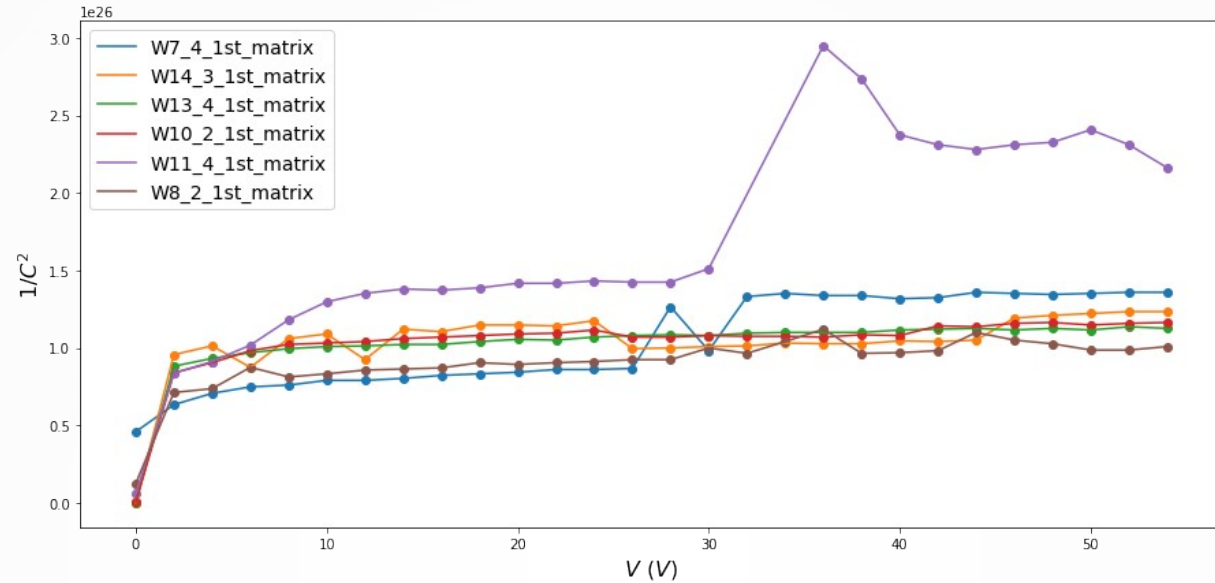
RD50-MPW2 C-V measurements

- C-V Measurements W13_4 (> 2 kΩcm) every geometry:



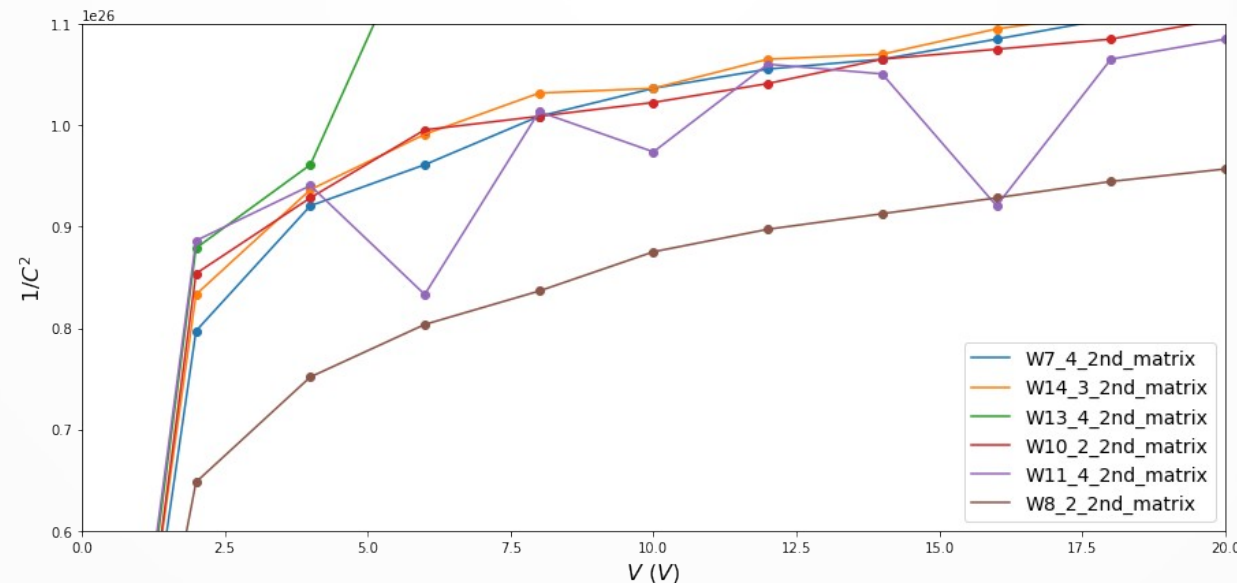
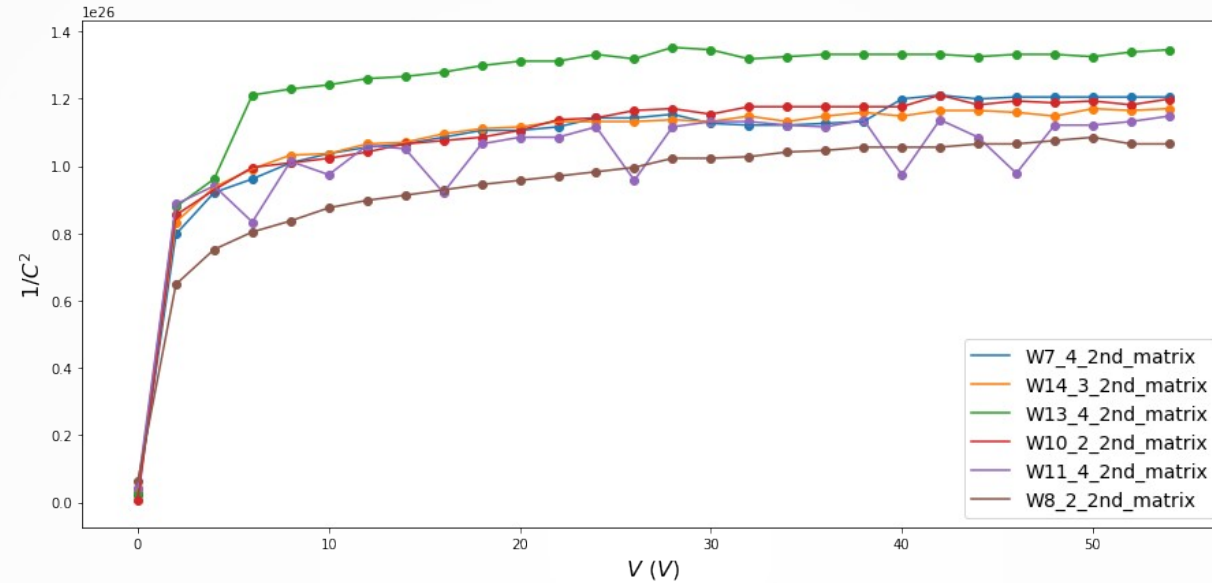
RD50-MPW2 C-V measurements

- C-V Measurements 1st matrix (rounded, 3 μm spacing):



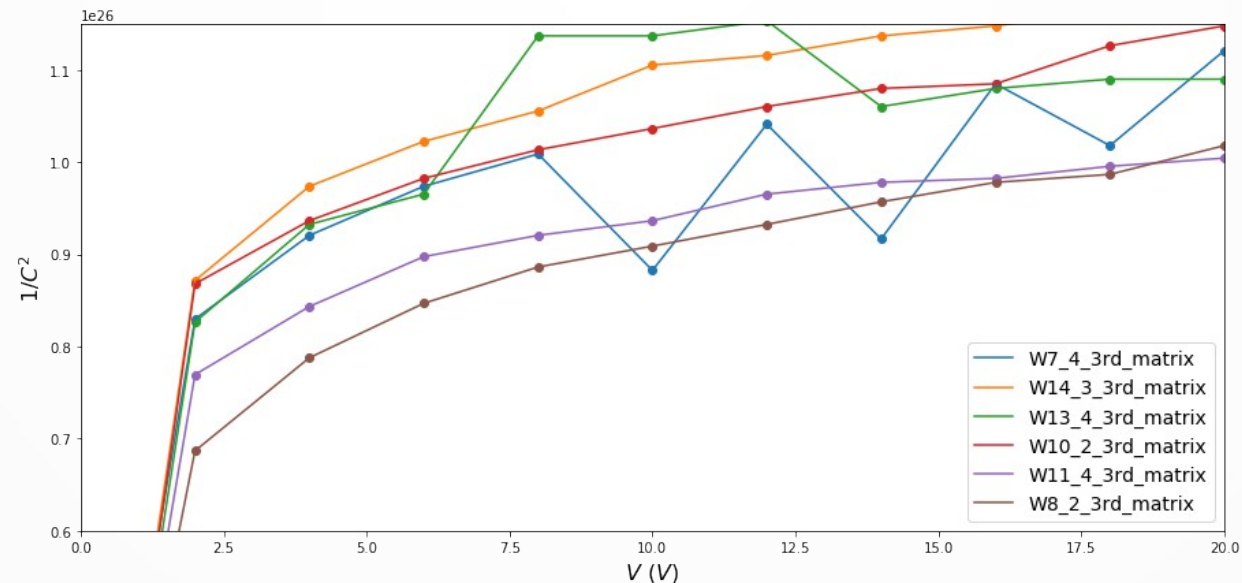
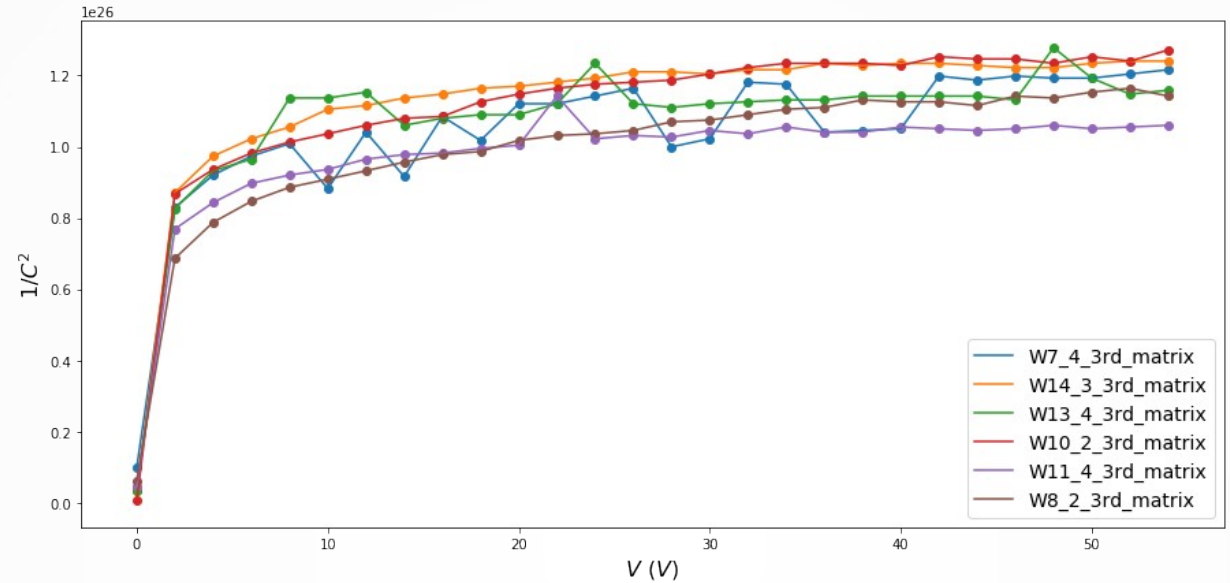
RD50-MPW2 C-V measurements

- C-V Measurements 2nd matrix (rounded, 8 μm spacing):



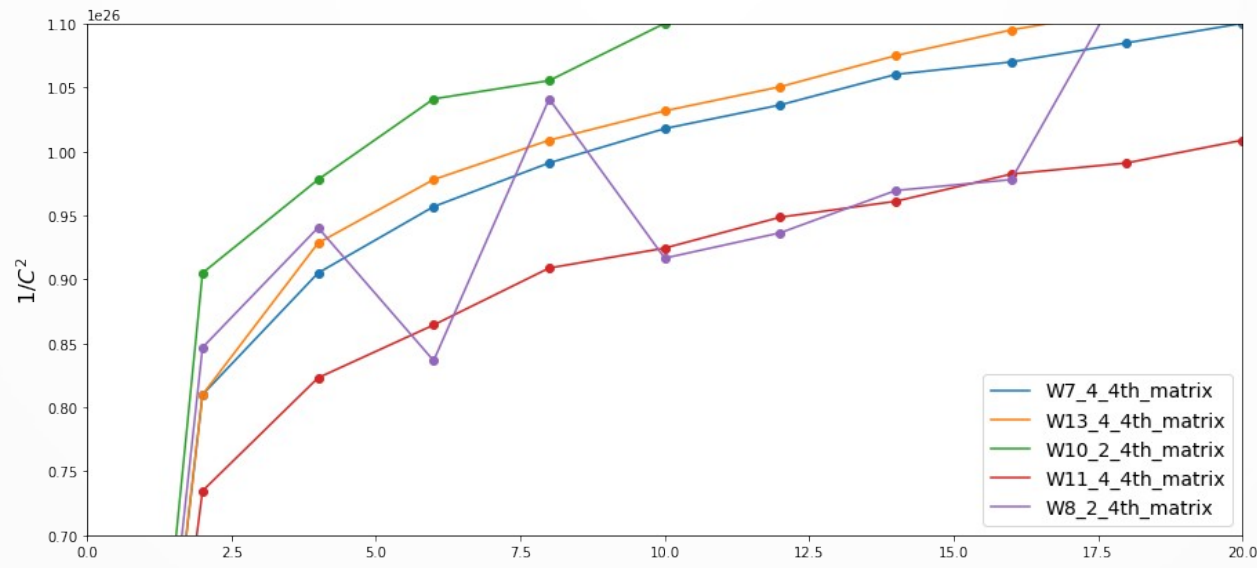
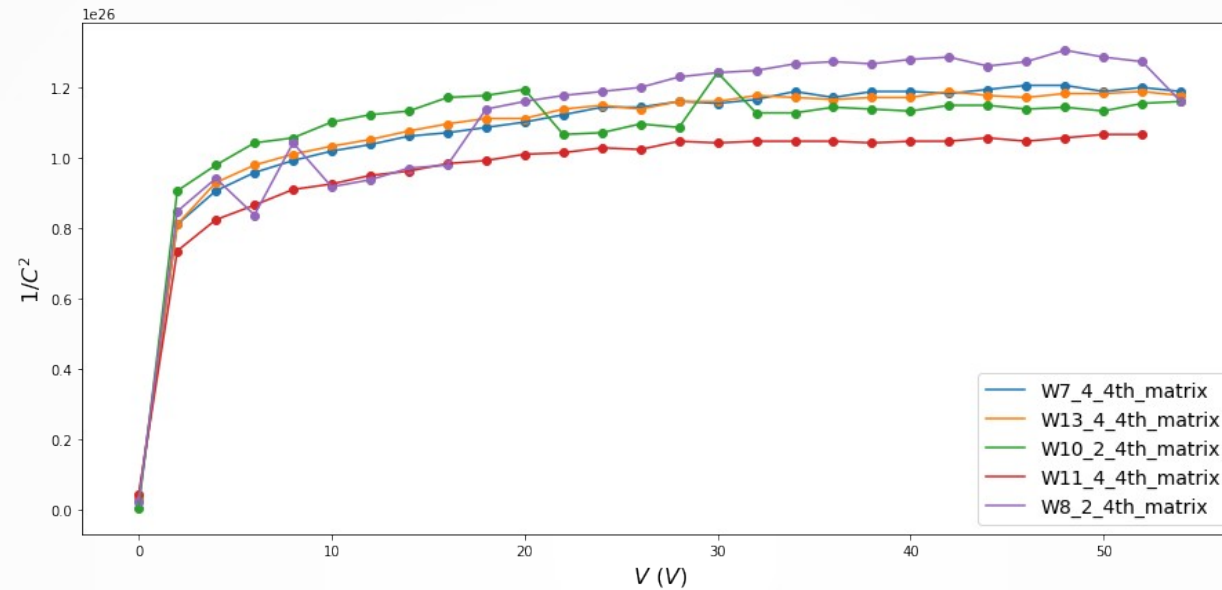
RD50-MPW2 C-V measurements

- C-V Measurements 3rd matrix (chamfered, 8 μm spacing):



RD50-MPW2 C-V measurements

- C-V Measurements 4th matrix (squared, 8 μm spacing):



Conclusions

- Capacitance between 100 - 125 fF for each pixel.
- MPW2 Documentation: “According to schematic simulations with Cadence, parasitic capacitance of one pixel is less than 200 fF when SUB is at -60 V.”
- The shape of the C-V curve is the one expected.
- Looking at the C-V curve shape, we can confirm that the pixel is mostly depleted at -10 V.