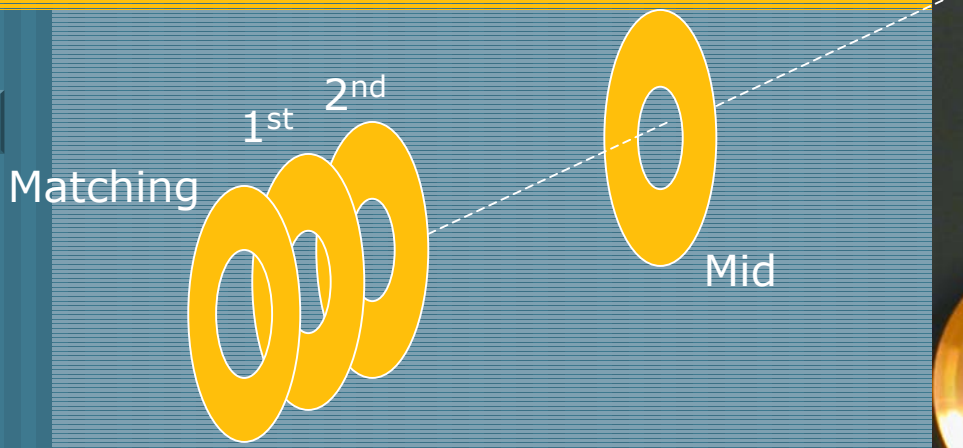
# Analysis of structures run at SLAC.

Irises of Mo.

# Introduction.



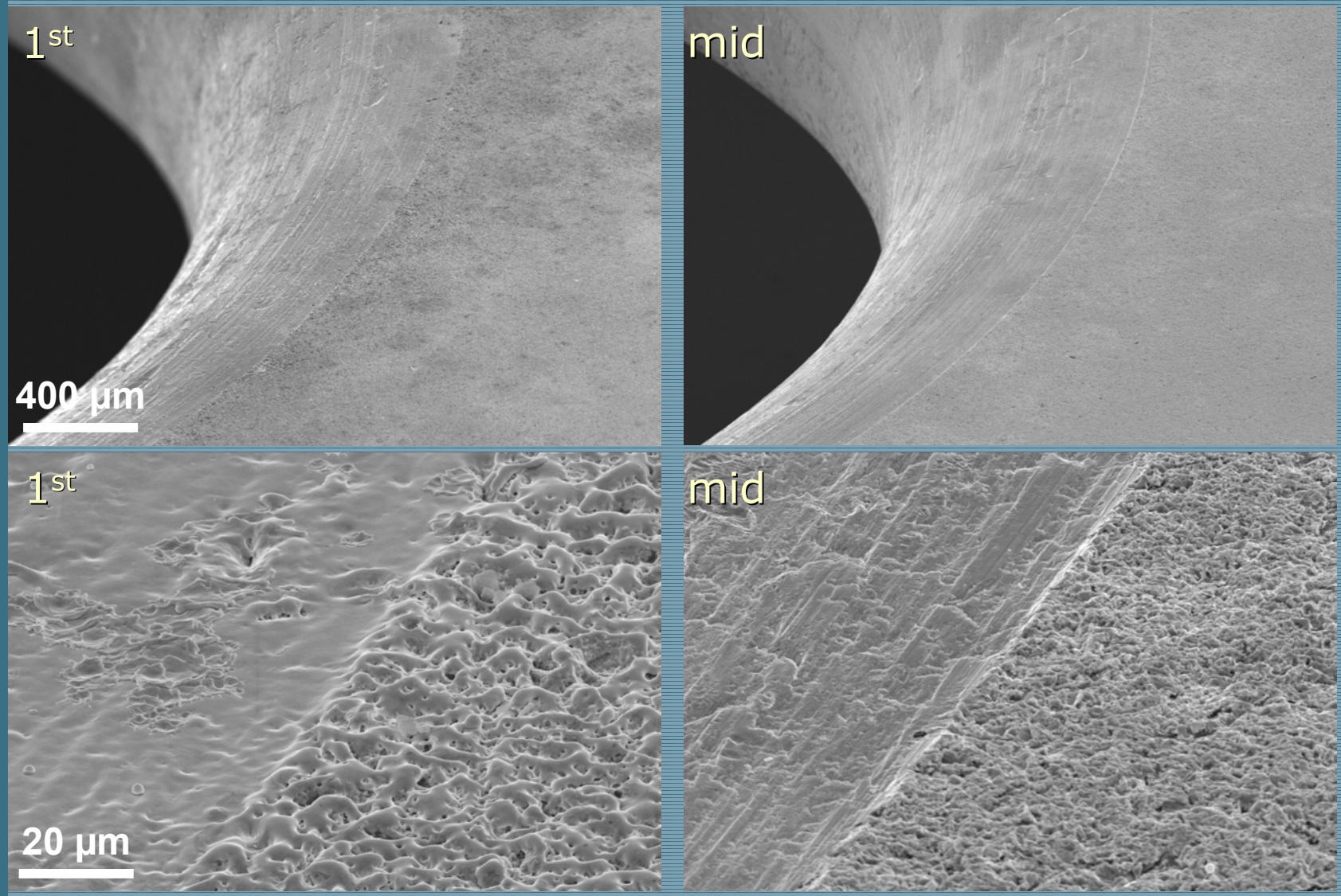


- Background:
  - Iris-in-copper-disc structures.
  - Run in SLAC, compared to CTFII runs
    - at 11 GHz.
    - longer pulses, 300 ns
  - Showed slow conditioning, max. surface field was 140 MV/m.
  - Materials:
    - Mo, fired at 800 ºC.
    - Structure filled before operation with 1 bar $N_2$ at 120 ºC.
- ➔ Analyses:
  - Surface SEM + EDS for first and intermediate cavities.
- ➔ Compared to Mo structure run in CTFII.

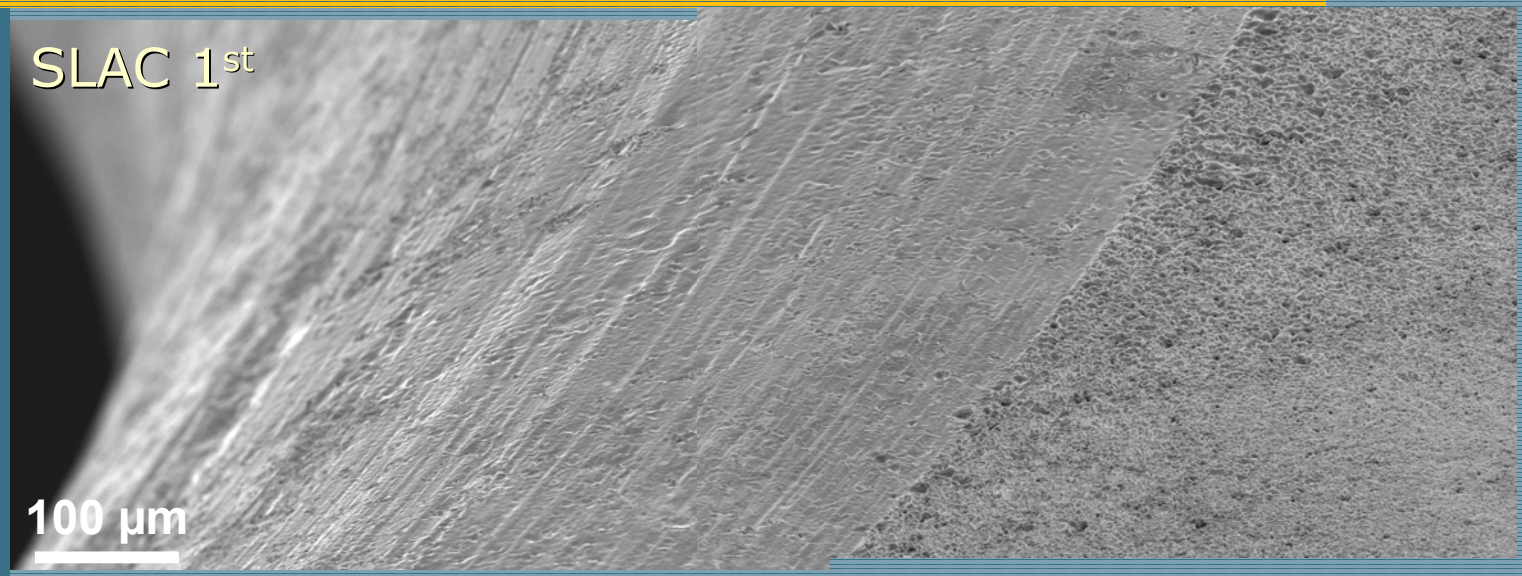
# Contents.

- Intro.
- Surface modifications.
  - Overview.
  - Comparative SLAC/CTFII Mo structures.
  - Comparison of different irises along the structure.
  - Comparison of different radial positions within one iris.
- Original Roughness of ground flat surface.
- Other issues.

# Surface modifications. Overview.



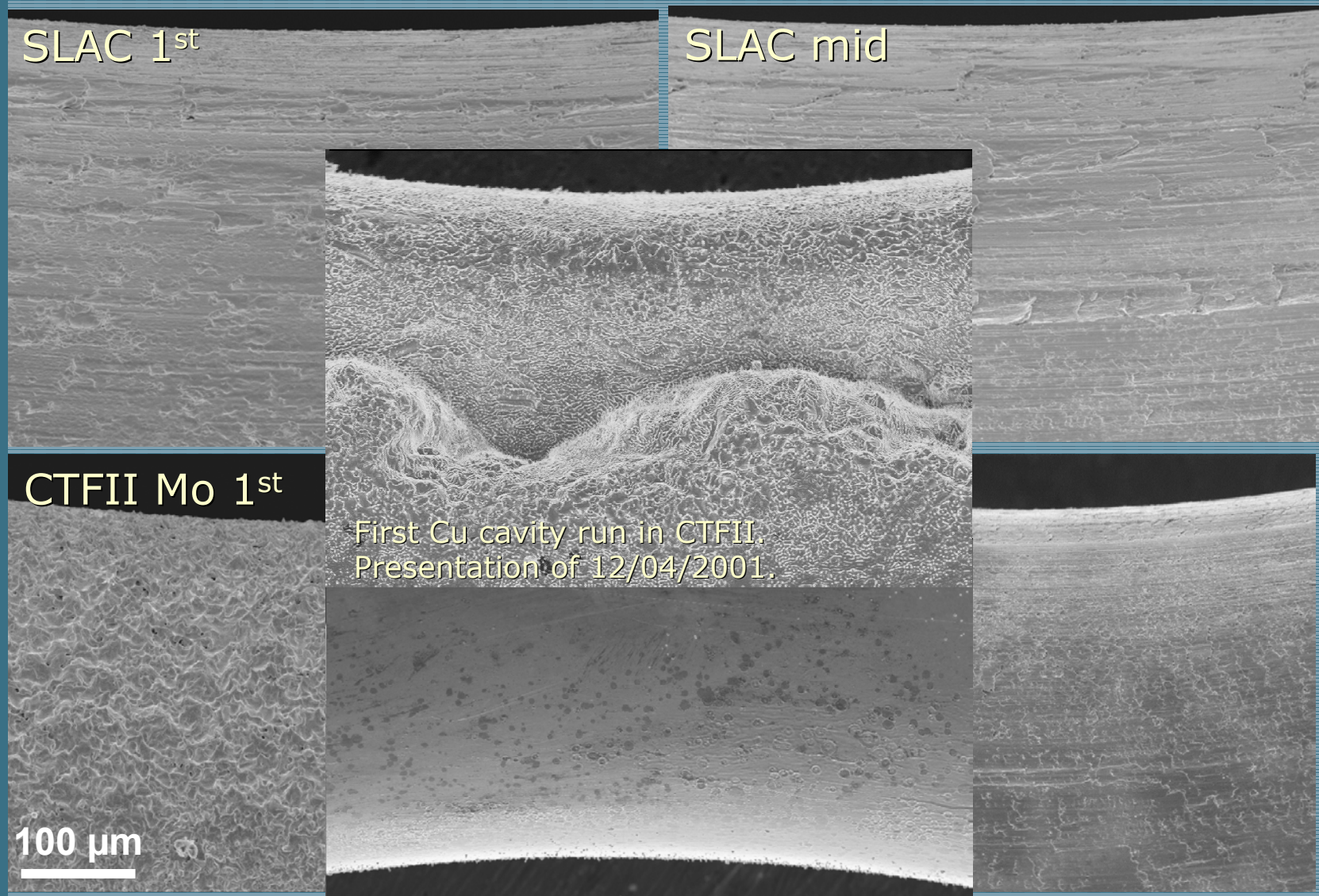
# Surface modifications. Overview.



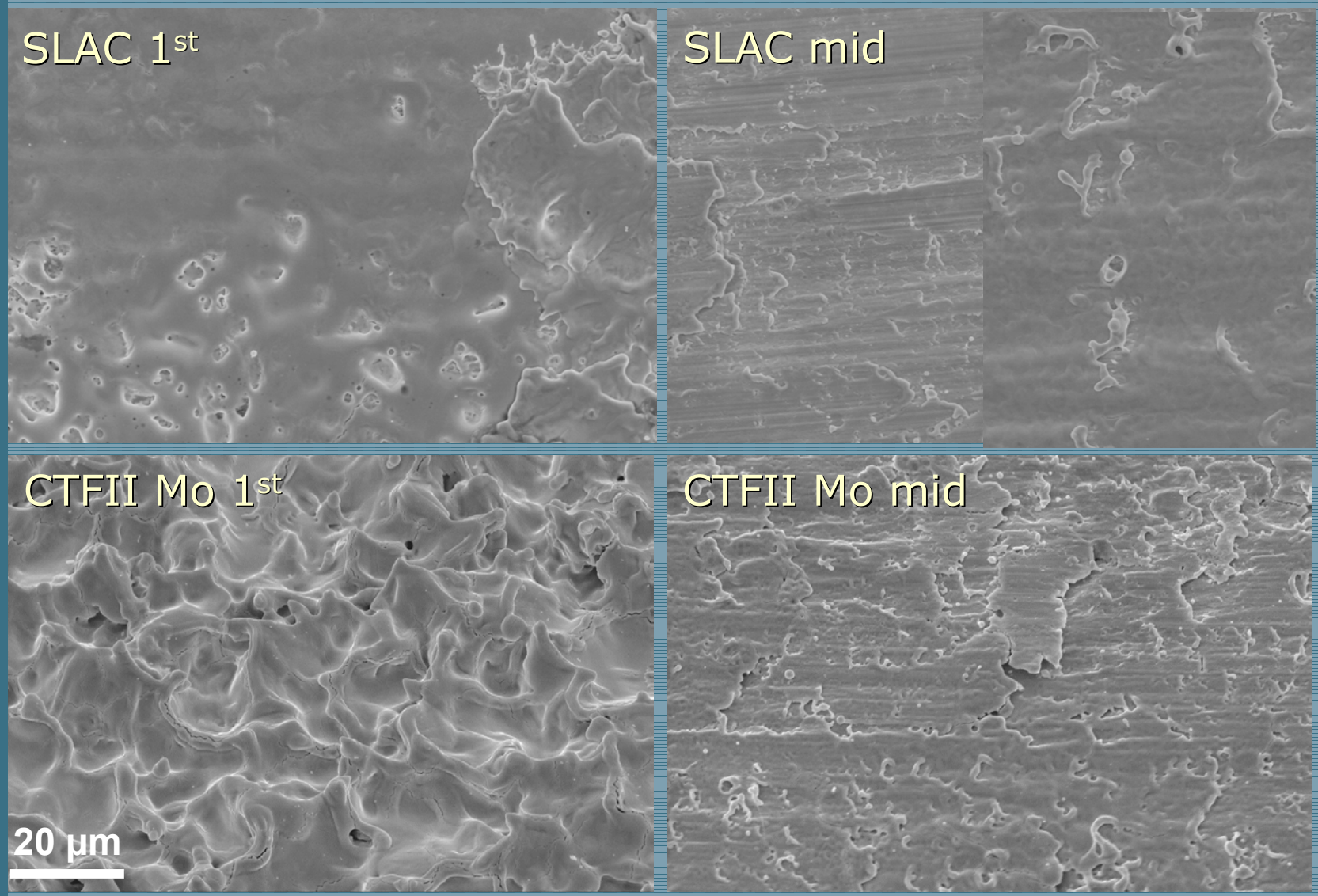



Reminder from CTFII structures

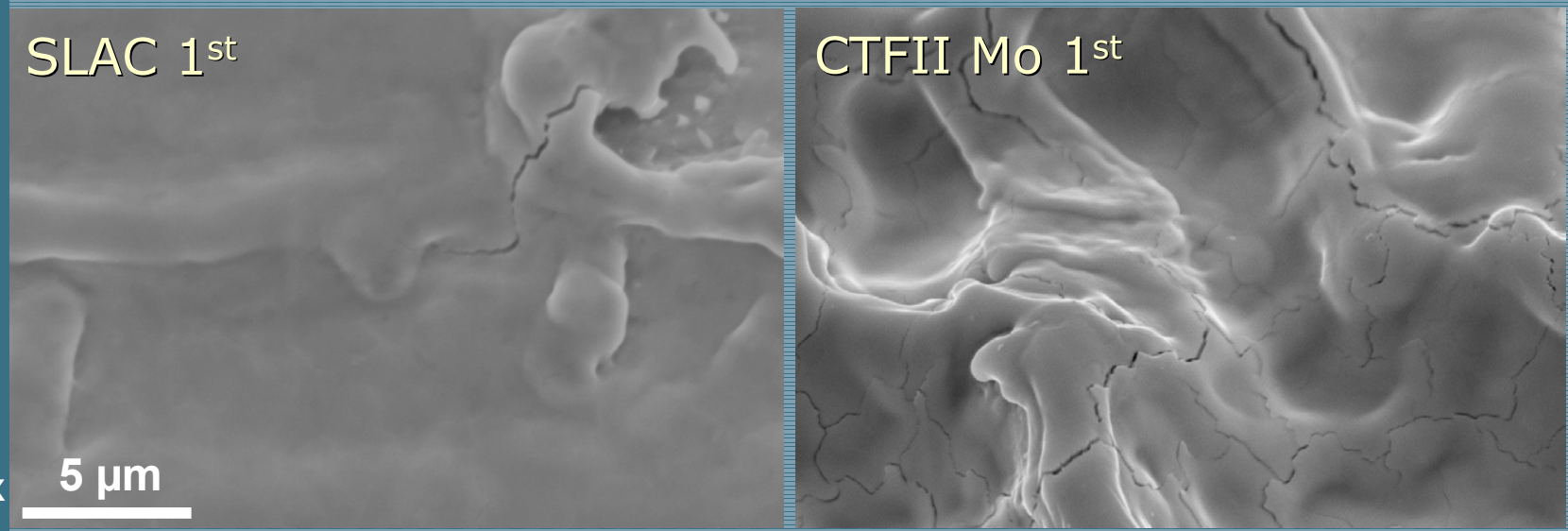
# Surface modification in tip region. Comparison 1st/mid-position and SLAC/CTFII.



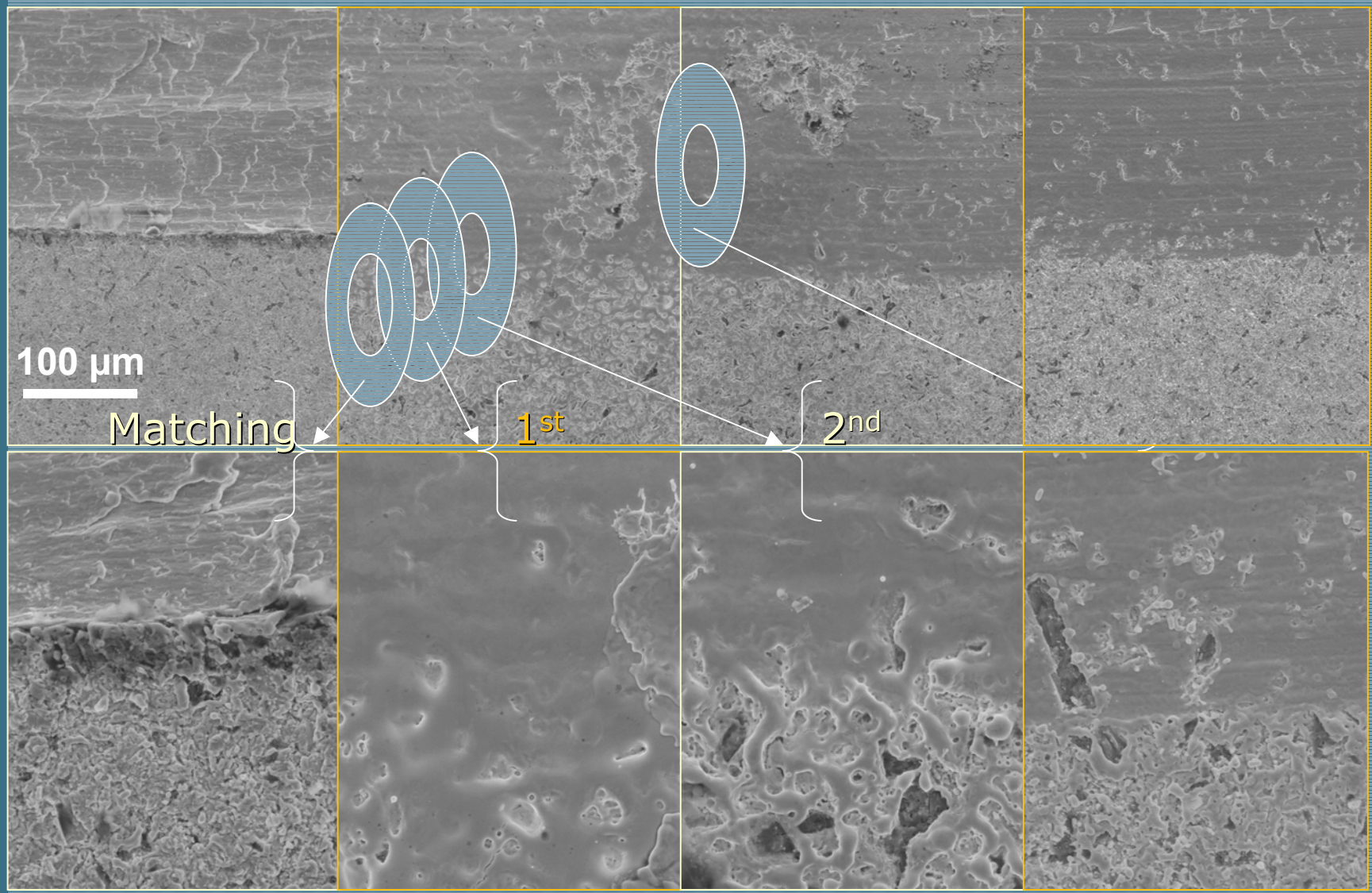
# Surface modification. Comparison 1st/mid-position and SLAC/CTFII.



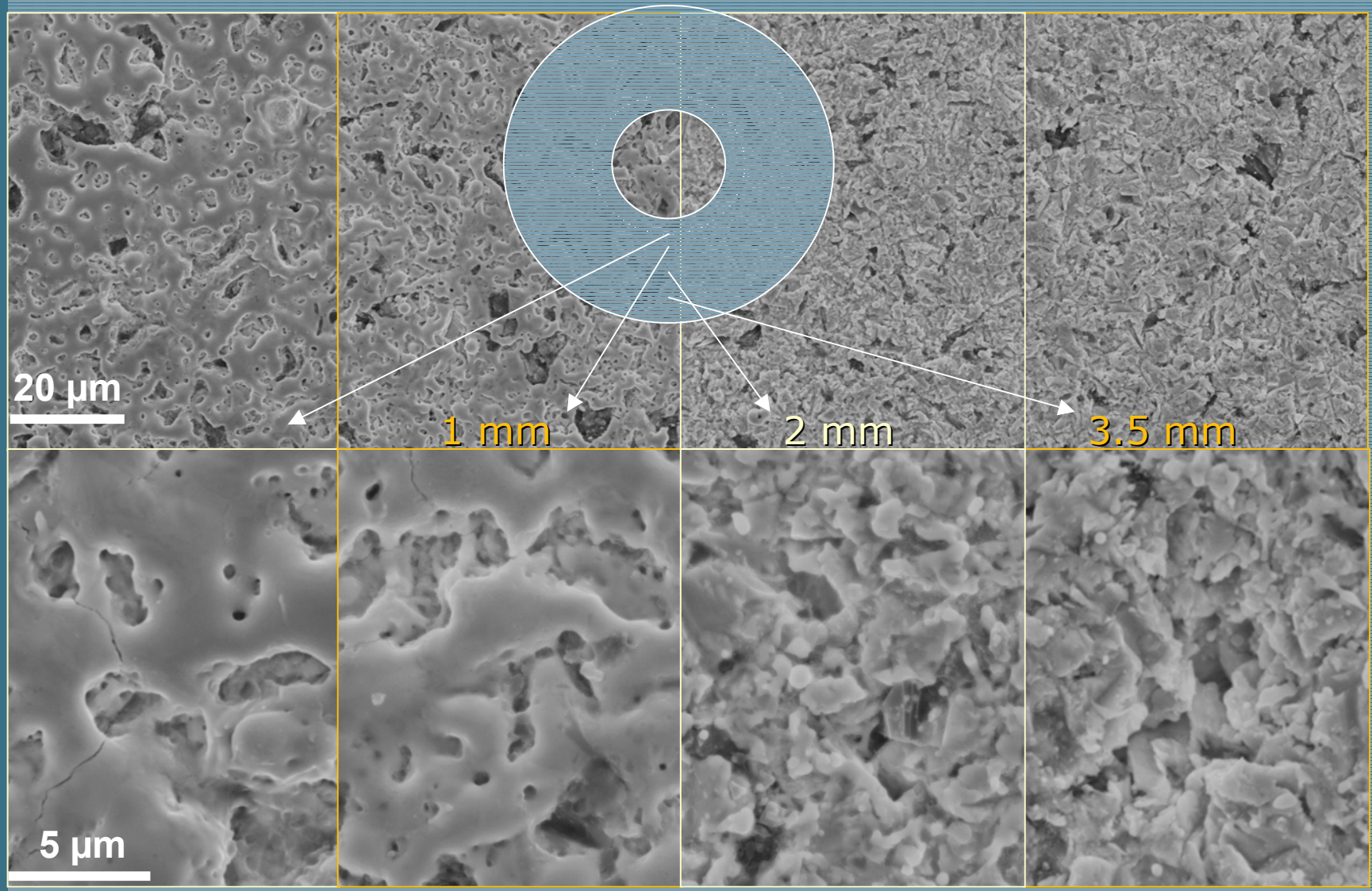
# Surface modification. Comparison SLAC/CTFII.



# Surface modification. Comparison along structure.



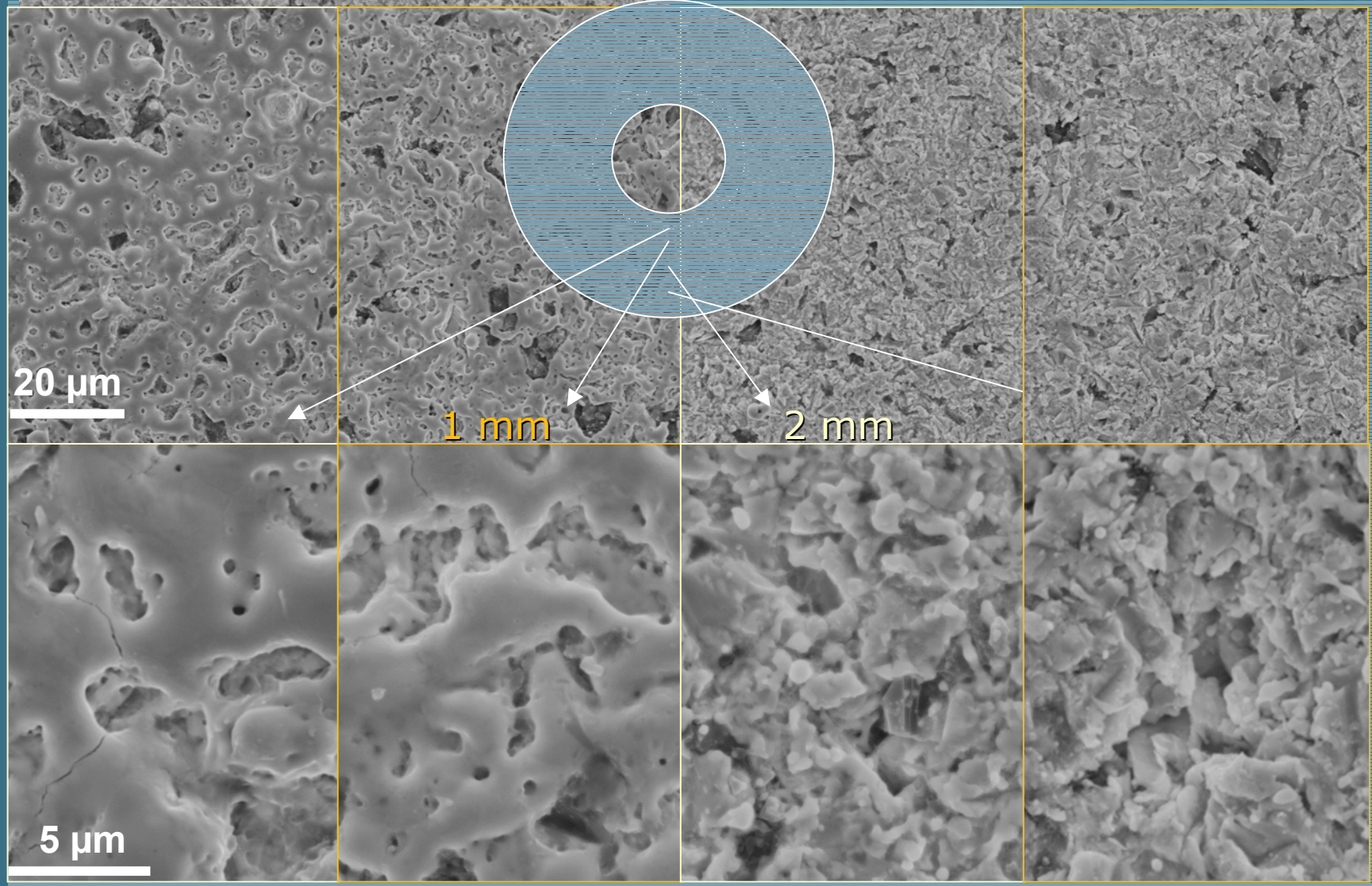
# Surface modification in tip region. Comparison at different positions in 1st iris.



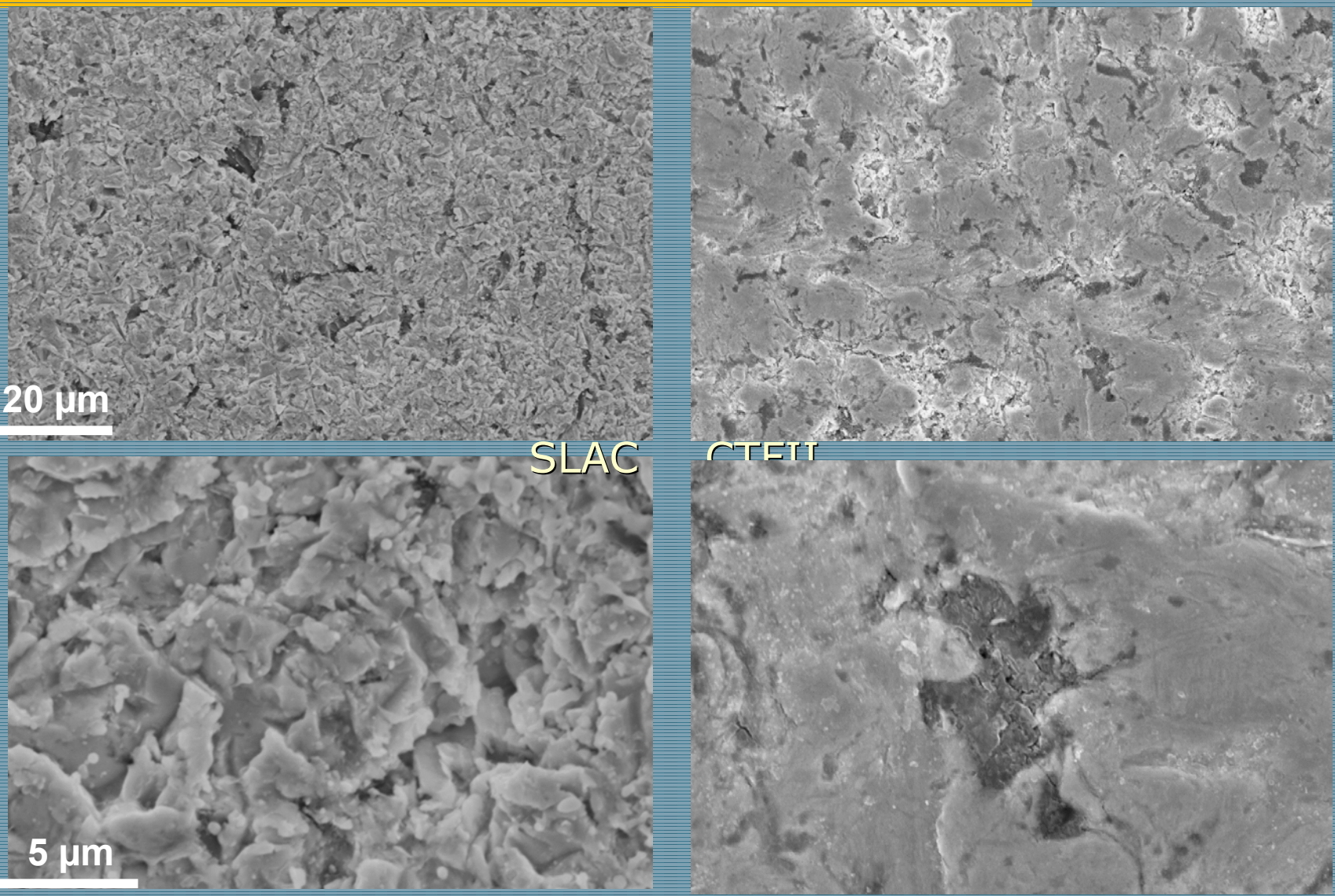
# Surface modification in tip region of irises.

- Surface modifications are marginal in general, no severe metal loss.
  - Even lower than previous CTFII Mo structure.
  - Smaller than machining roughness.
- 1st iris more severe modifications than mid-position irises.
- Features:
  - Smoothened surface: starts in first iris, very limited in mid-position one.
  - Craters and clusters of craters: mainly in 1st irises.
  - Crests: none or just incipient.
  - Cracks: very limited.

# Original roughness of ground flat surface. First iris.



# Original roughness of ground flat surface. Comparison SLAC/CTFII irises.



# Original roughness of ground flat surface.

- Original ground flat surfaces (regardless the effect of run).
  - Roughness apparently higher than in CTFII irises.
  - Si- and C-rich particles embedded, as in CTFII irises.

# Other issues.

1. The toroidal surface presents numerous machining defects.

2. Macroscopic visible black tracks in matching iris. They contain Al, they might be due to wrapping in aluminum foil. The surface does not present any morphology difference.

3. Dark spots in some copper surfaces. They are very superficial, SEM and EDS do not reveal differences from the bulk. They can be related with the presence of pollution particles.