UNIVERSITY OF LIVERPOOL

1st TCT Workshop

Sensor Preparation

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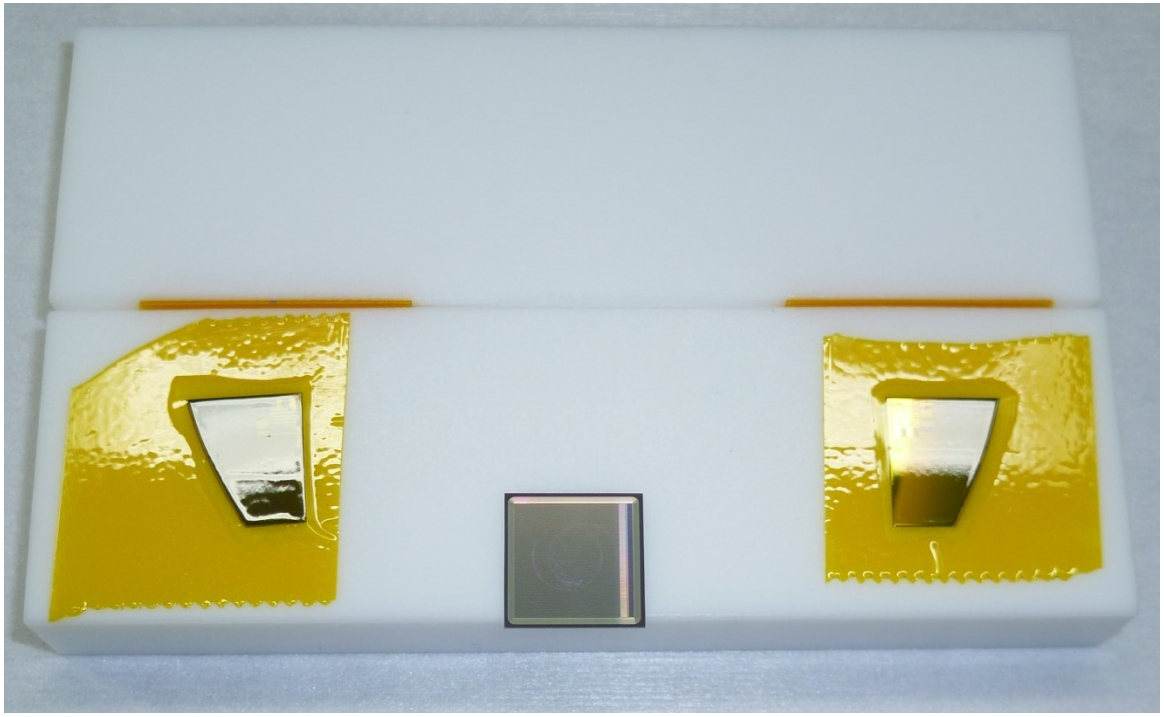
Thanks to Marcos Fernandez Garcia ,
Christian Gallrapp and Hannes Neugebauer

Edge Polishing

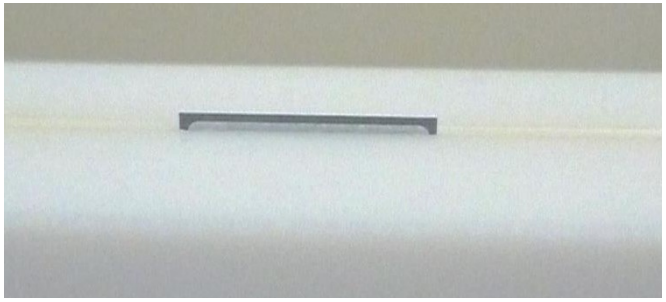
For eTCT measurements the sensor edge needs to be polished

Polish Edge

- To fixate the sensor use plastic / teflon bars
  - To keep the distance and not damage the sensor, use silicon pieces as spacers



- Spare silicon pieces at each side of bar to keep distance
- Place sensor at edge of bars with a small overhang
- Fixate sensor with Kapton



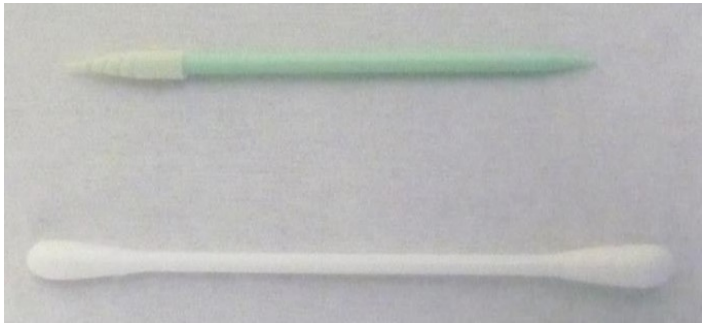
Polish Edge

- Polishing the edge is a 2 step process:
  - First use diamond lapping film (3µm Grade)

    http://www.thorlabs.de/thorproduct.cfm?partnumber=LF3D
  - For fine polishing use diamond paste (1/10µm Grade)

    http://uk.rs-online.com/web/p/diamond-pastes-slurries-lubricants/3155125/

    - Application of the paste with cotton buds works better than actual cleanroom foam swabs



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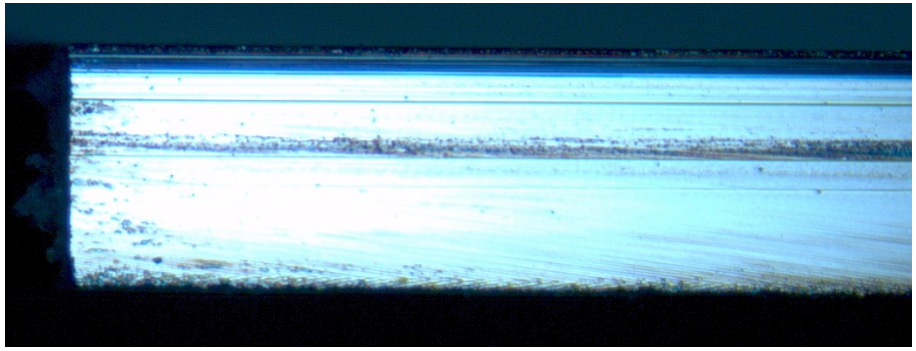
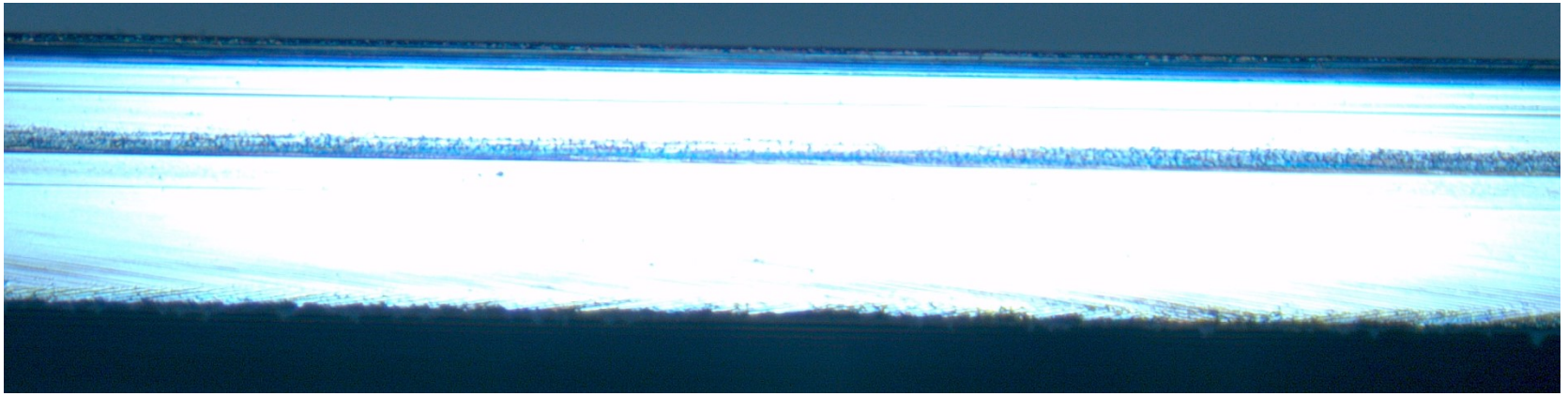
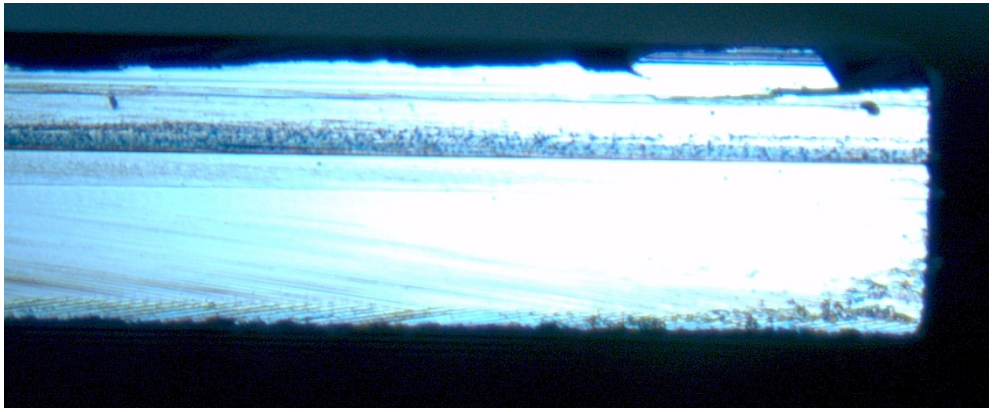
Unpolished



After cutting surface not suitable for edge TCT





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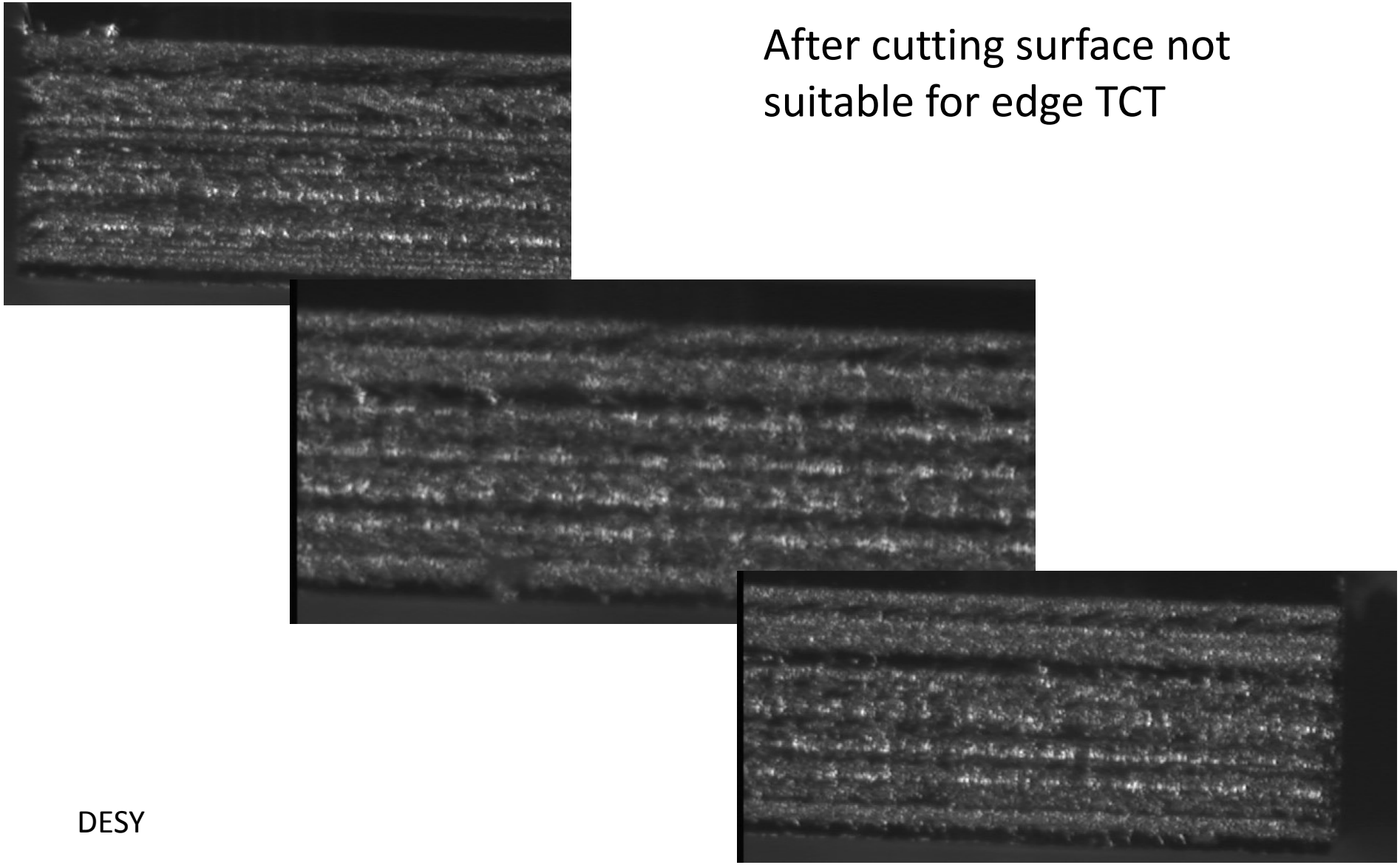
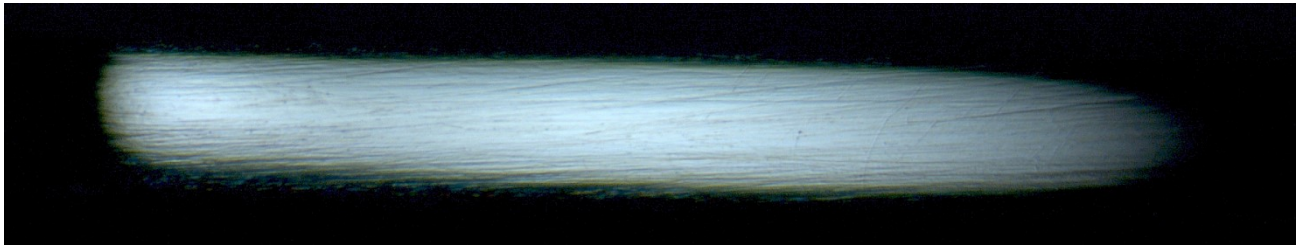
Unpolished

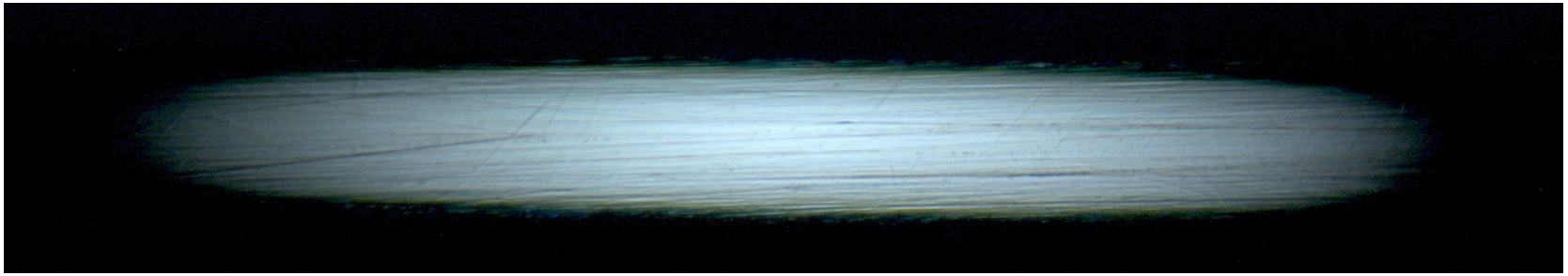


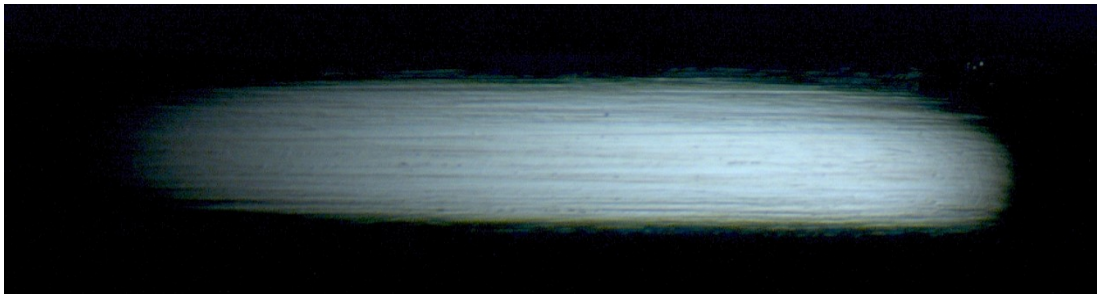
After cutting surface not suitable for edge TCT

DESY

Polished with lapping film

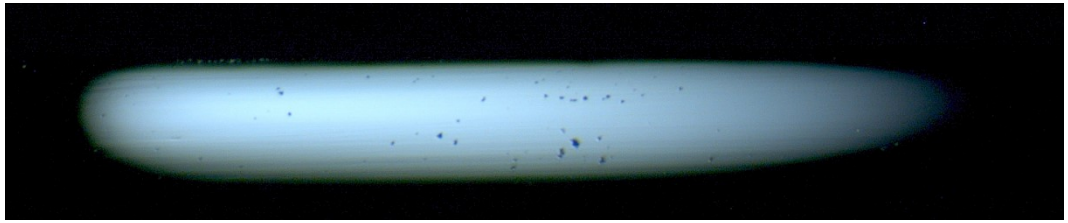


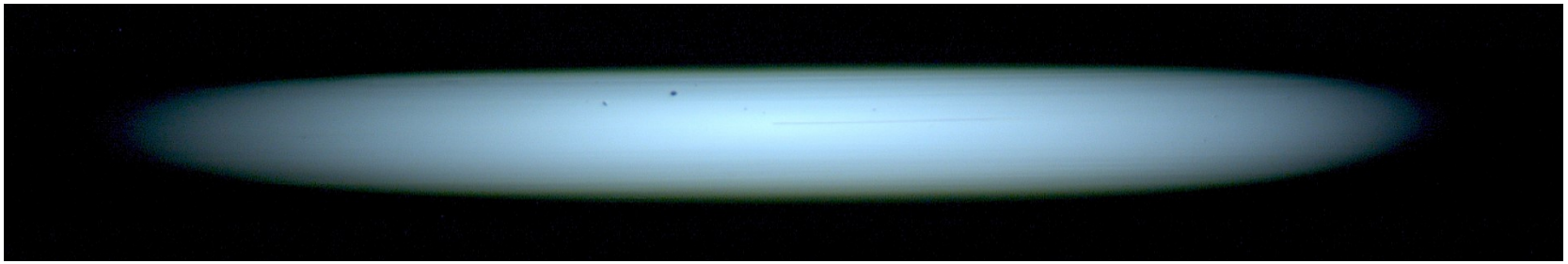


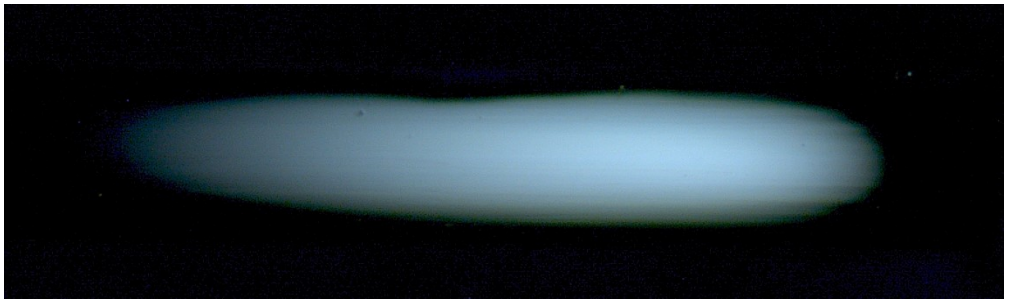


Polishing with lapping film: remove large scratches; the final result should be a homogeneous surface with only thin scratches

Polished with paste







Polishing with paste: remove all scratches; final result is a smooth surface without scratches

Comments

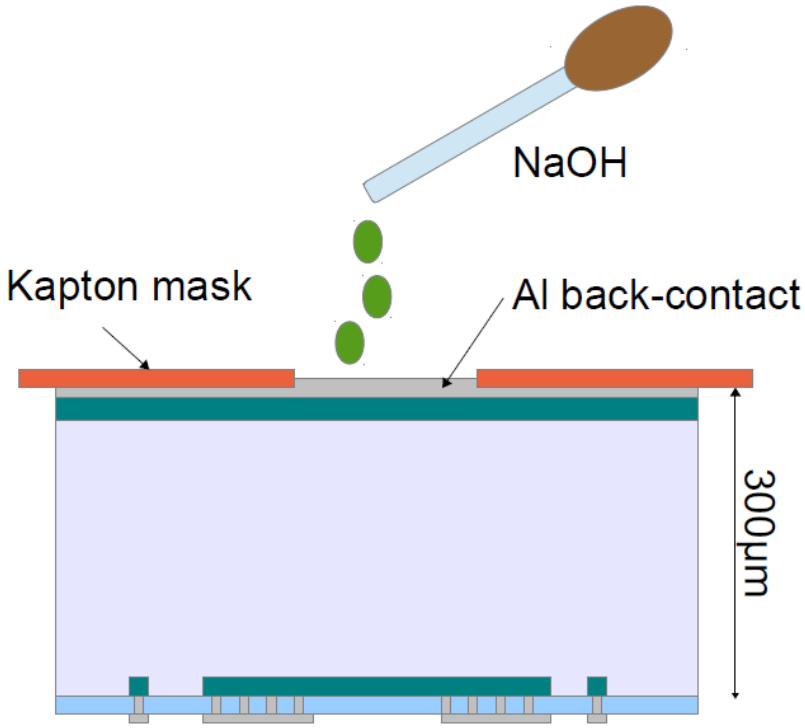
- make sure that the whole sensor edge is polished (also close to the corner)
- Fixation of the silicon with Kapton works best
  - Can be removed easily with Ethanol
- Cleaning the whole sensor after polishing is important for the wire bonding
  - Ethanol works well
    - Propanol works too, but Ethanol is preferred
  - Eventually a ultrasonic bath for ≈10 - 20 seconds

In the lab session this afternoon everyone will have the opportunity to polish a sensor edge

Backside Etching

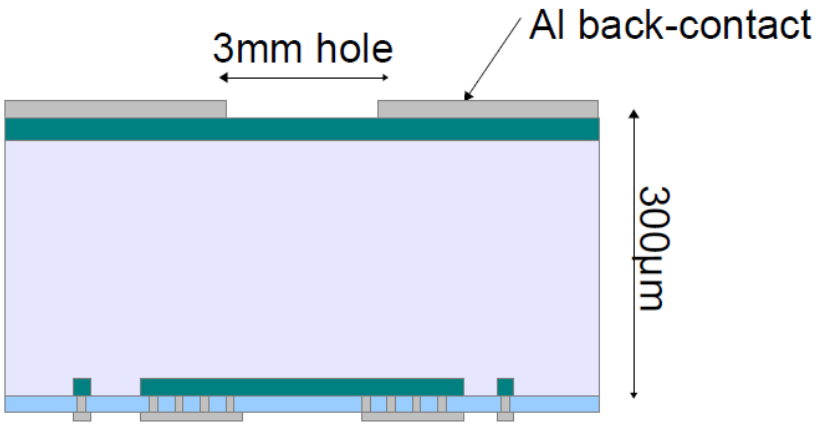
The metallization at the backside of the sensor needs to be removed for TCT measurements

Backside etching



- Kapton tape with hole (<3mm) as mask
- Place sample with backside on top onto a surface and fix with Kapton, so that only the hole is not covered
- Apply NaOH with cotton bud onto the metal (1-2 drops, depending on hole diameter), let it react
  - It should become cloudy when the metal comes off
- Take care not to wait too long
  - The NaOH can flow below the Kapton and ruin the sensor

Backside etching



- **Rinse with ethanol and distilled water**
- Repeat 1 – 2 times, depending on requirements
- Carefully remove Kapton