



Nb bulk QPR polishing

3rd IFAST WP9 Meeting/ 18th November 2021

Oleksandr Hryhorenko / IJCLab - CNRS

Thomas Proslie / CEA - IRFU

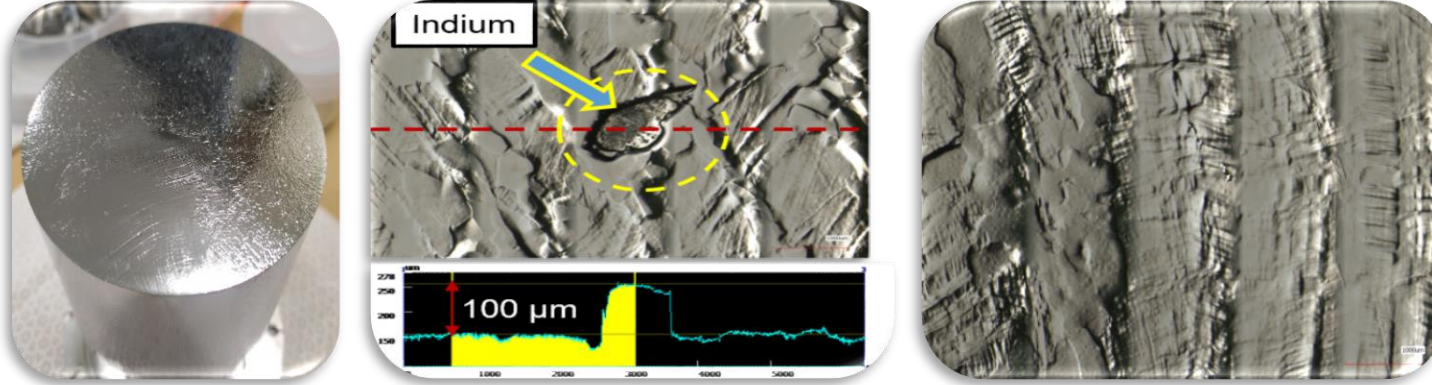
Claire Antoine / CEA - IRFU

David Longuevergne / IJCLab - CNRS



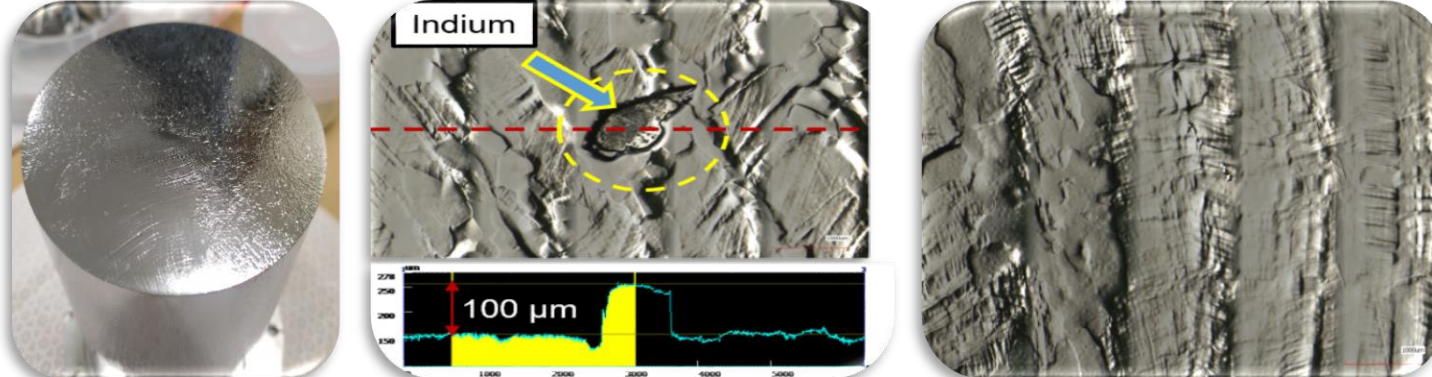
Previous QPR processing (2nd iFast Meeting)

As received

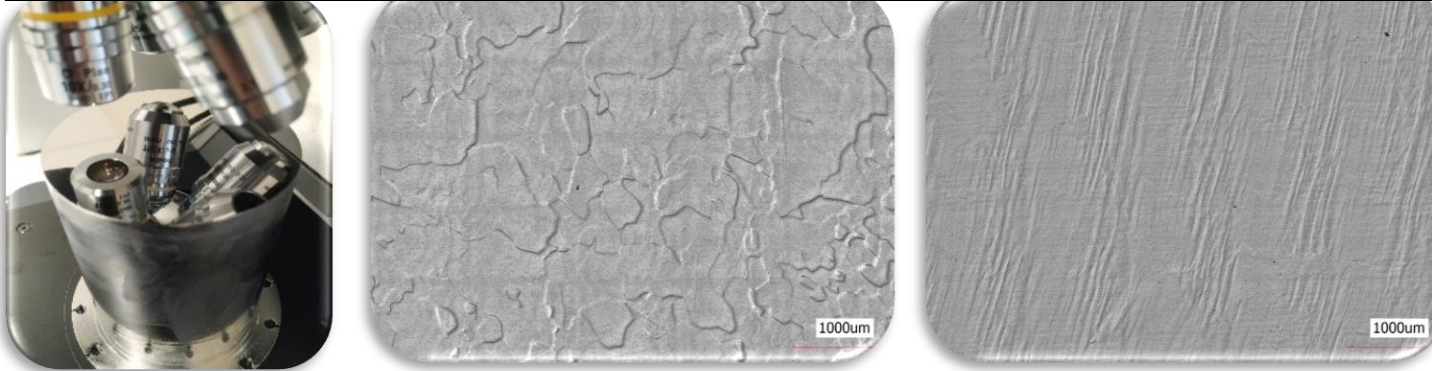


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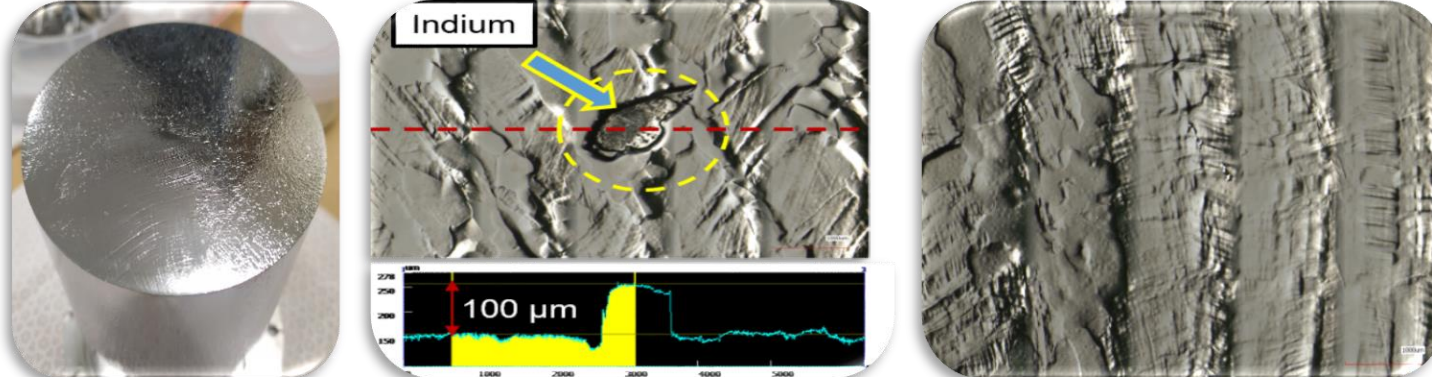


After metallographic polishing (MP) – 120 μm

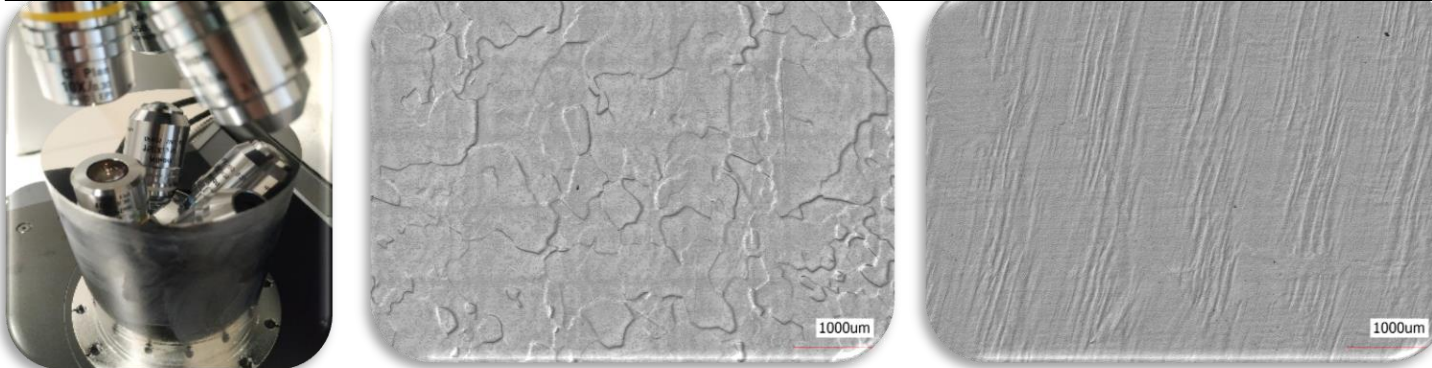


Previous QPR processing (2nd iFast Meeting)

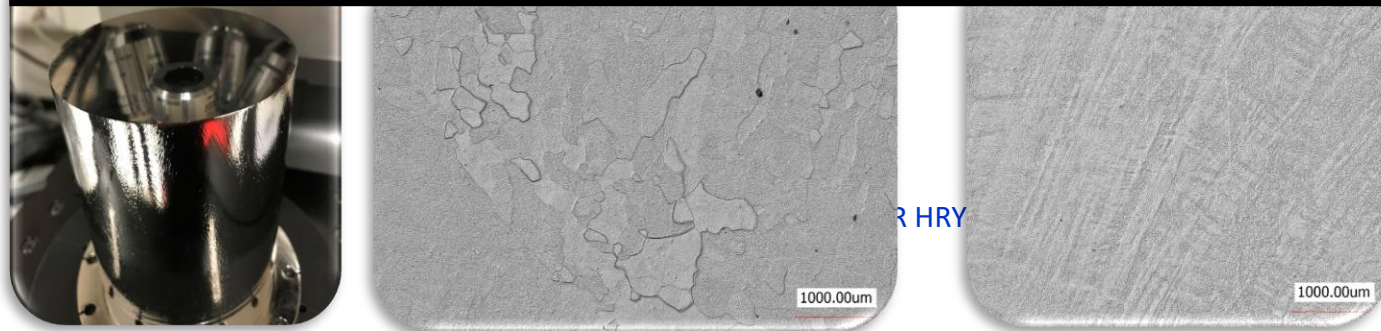
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After metallographic polishing (MP) – 120 μm



After bulk EP (150 μm) + annealing (900°C/3 hours) + final EP (20 μm)

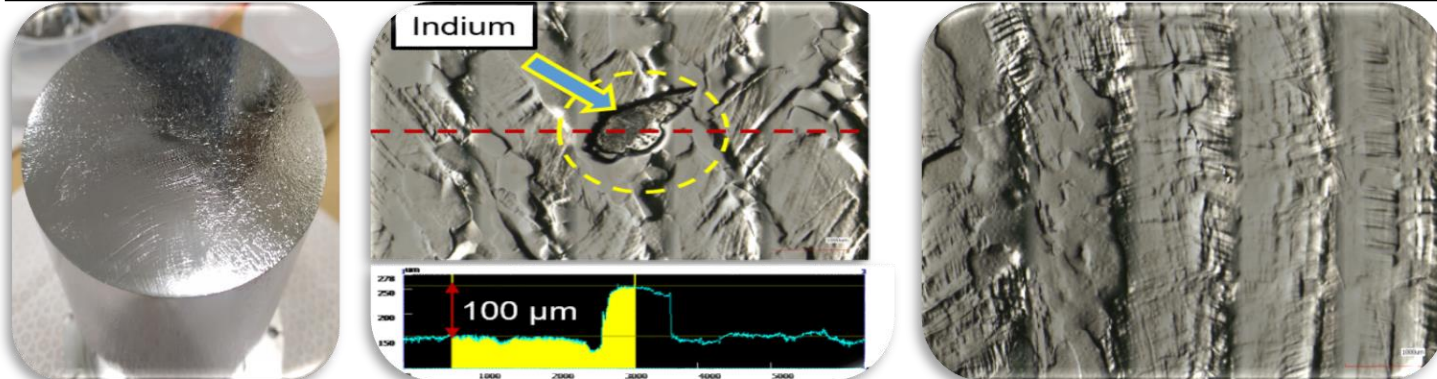


R HRY

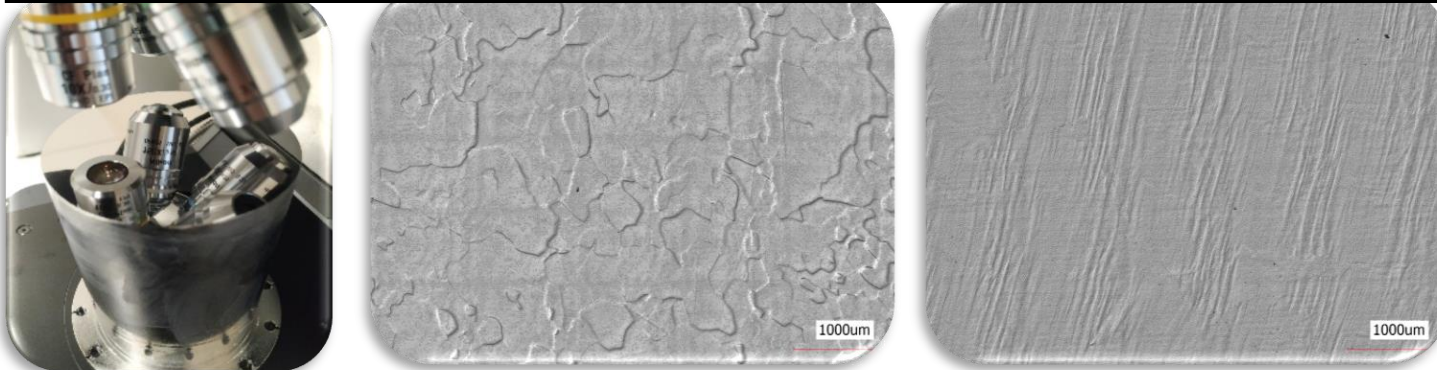
ing - 18th November 2021

Previous QPR processing (2nd iFast Meeting)

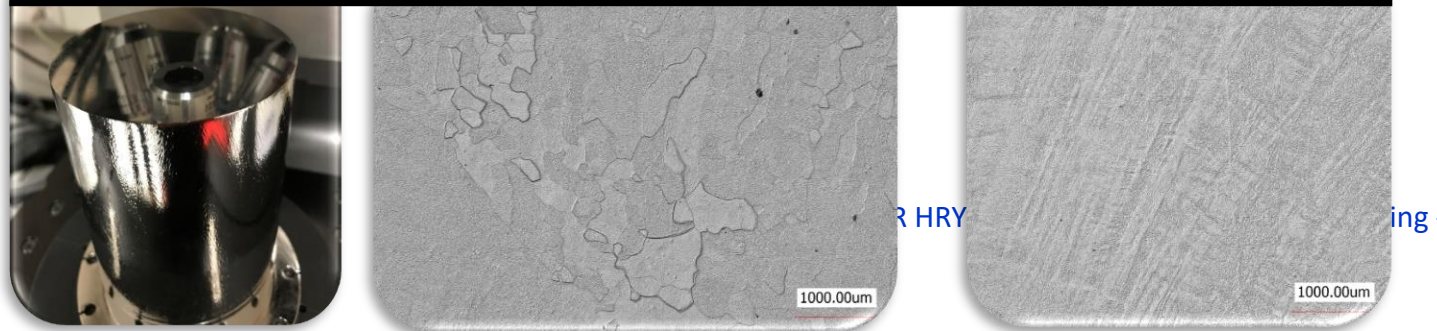
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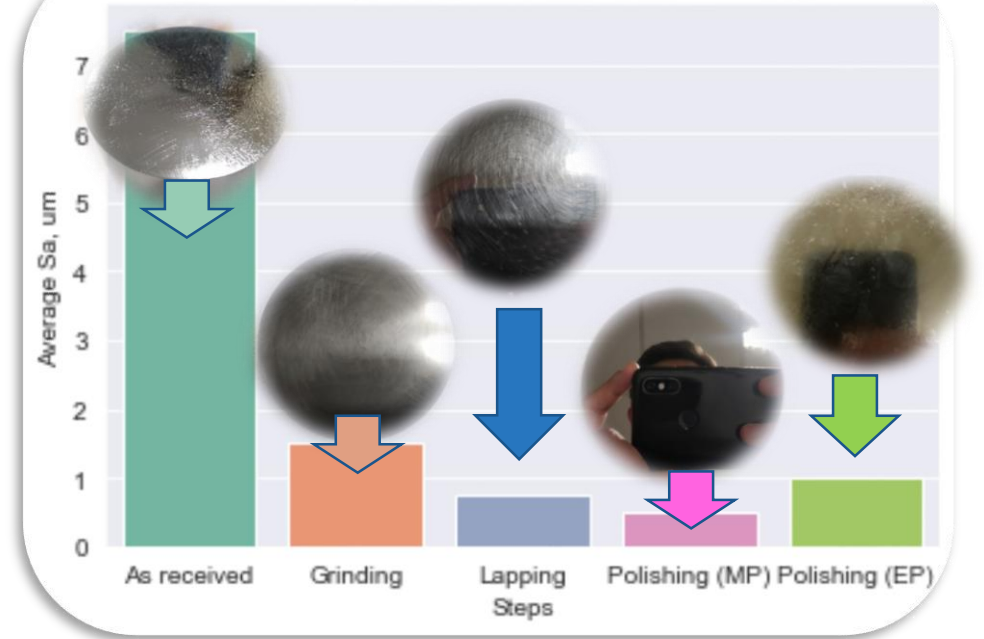
After metallographic polishing (MP) – 120 μm



After bulk EP (150 μm) + annealing (900°C/3 hours) + final EP (20 μm)

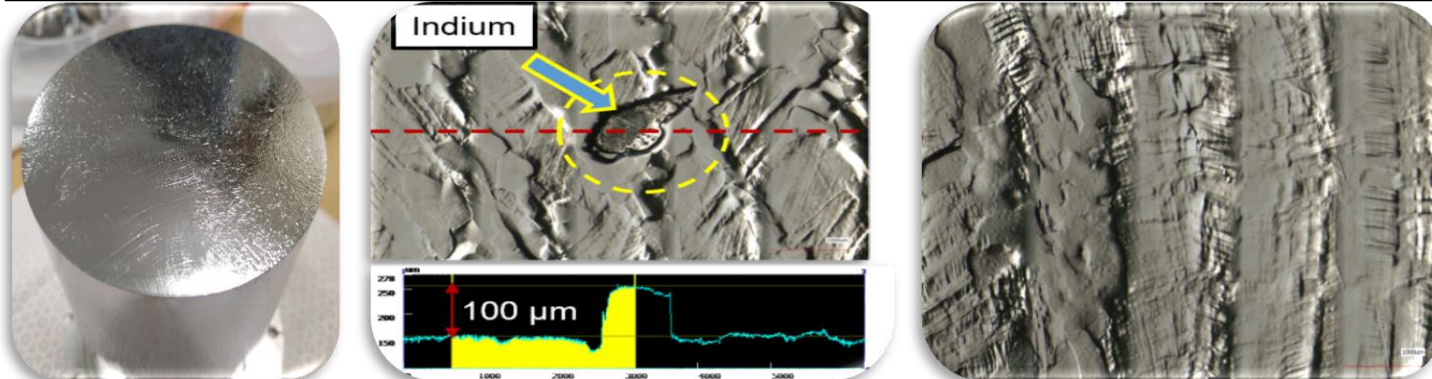


QPR average roughness versus treatment type

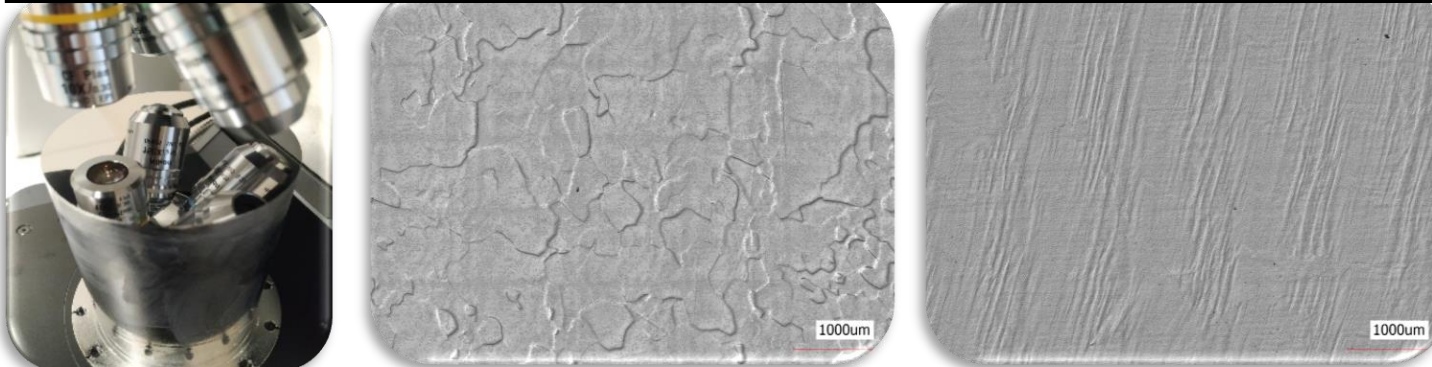


Previous QPR processing (2nd iFast Meeting)

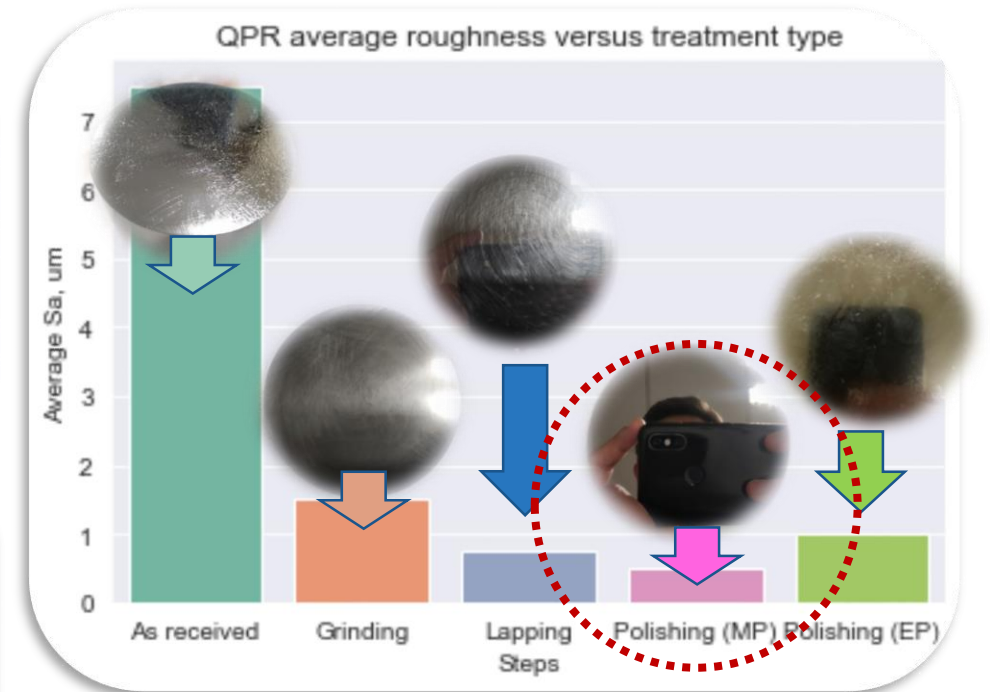
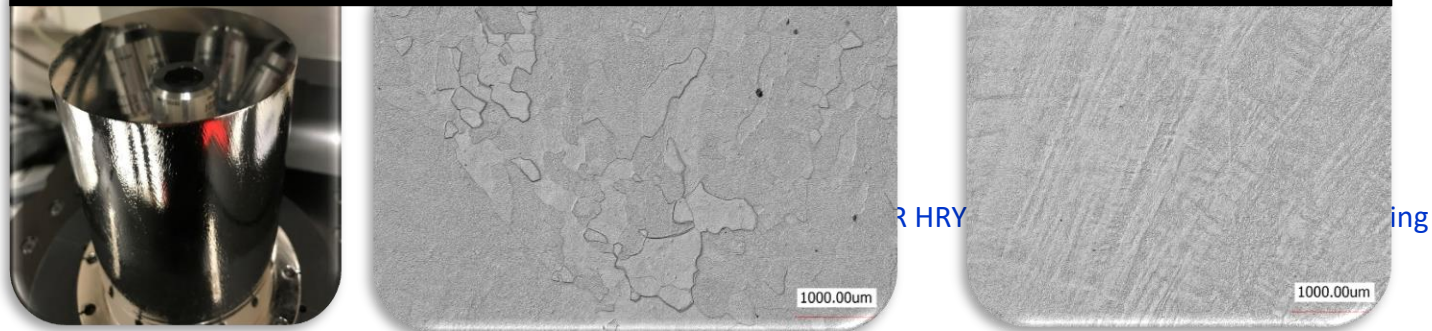
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After metallographic polishing (MP) – 120 μm



After bulk EP (150 μm) + annealing (900°C/3 hours) + final EP (20 μm)



SUMMARY:

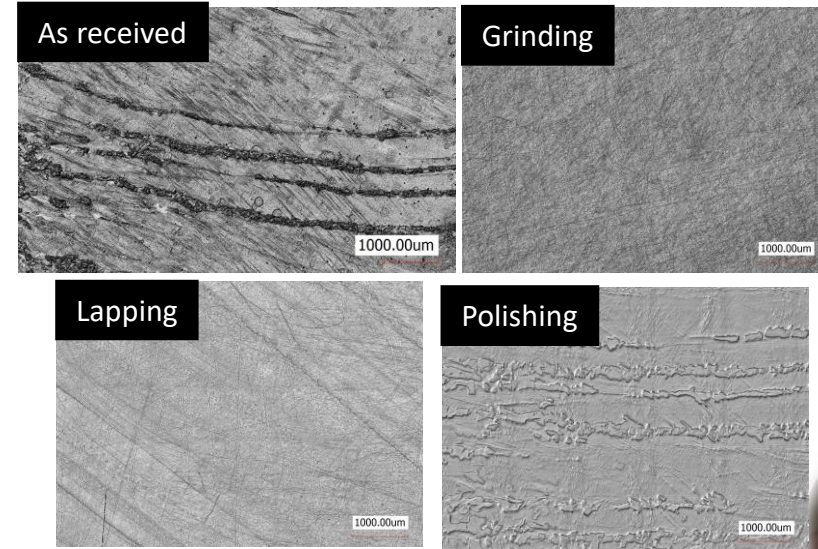
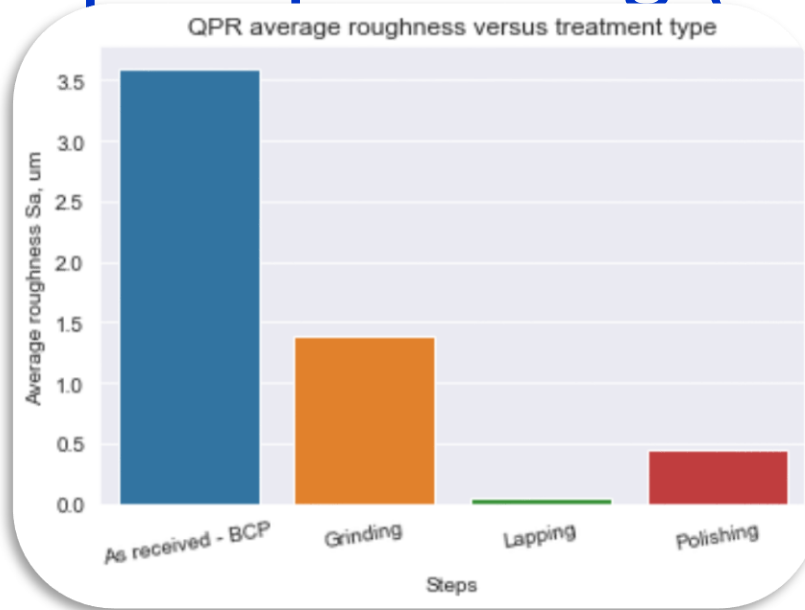
- Indium contamination is removed by MP (removal of 120 μm)
- Low roughness is obtained by MP (Sa=0,5 μm)
- Residual damages still present even after bulk EP (~ 150 μm) + annealing + final EP (20 μm)
- Roughening is observed after EP (Sa = 1 μm)

Perspectives:

Evaluate the RF performance of the QPR sample after MP polishing

Metallographic Polishing (MP)

Metallographic polishing (MP)



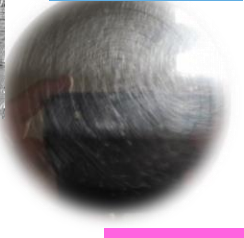
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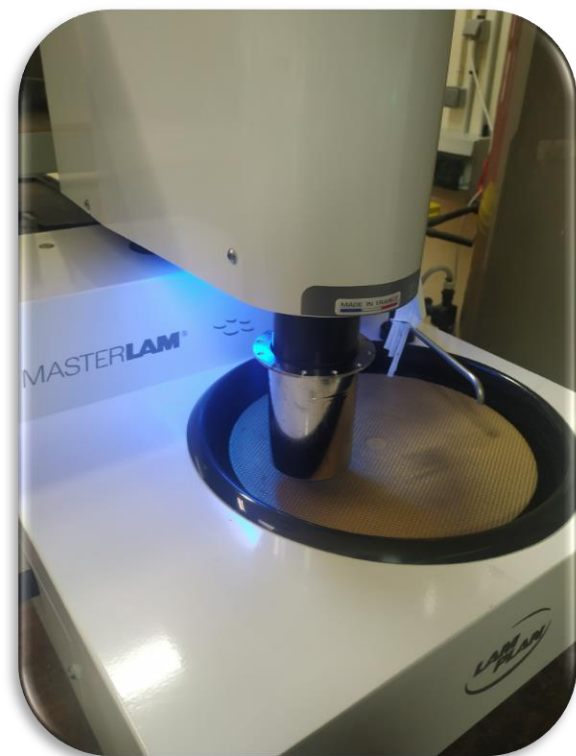
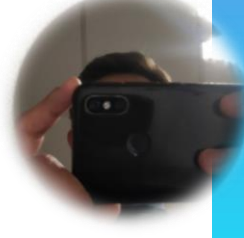
Grinding



Lapping



Polishing



Metallographic polishing (MP)

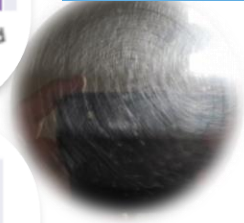
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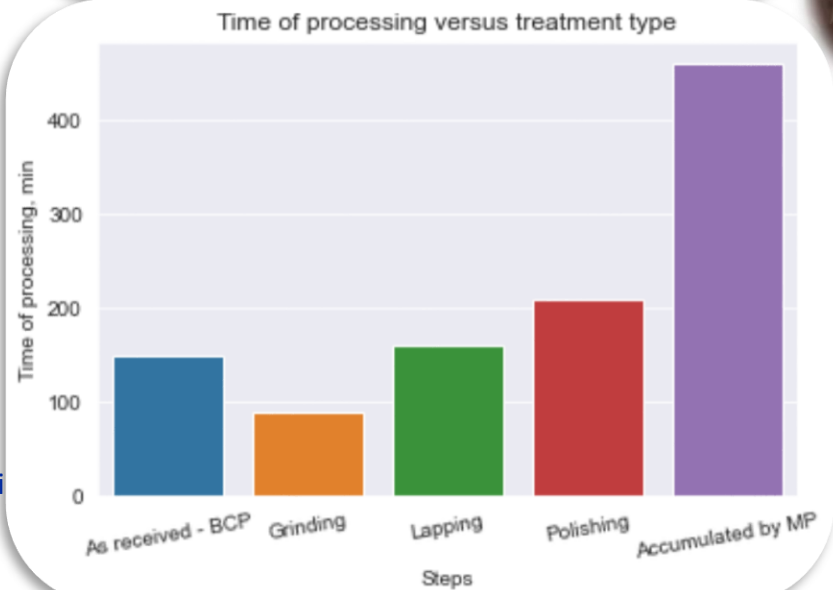
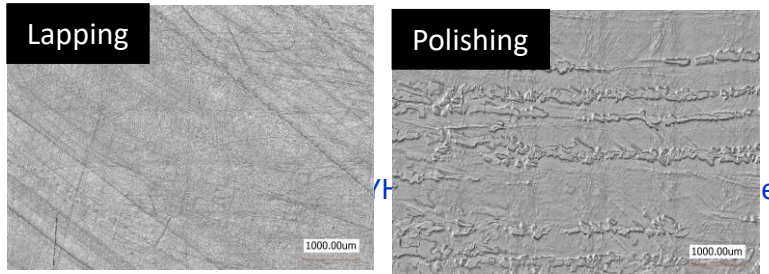
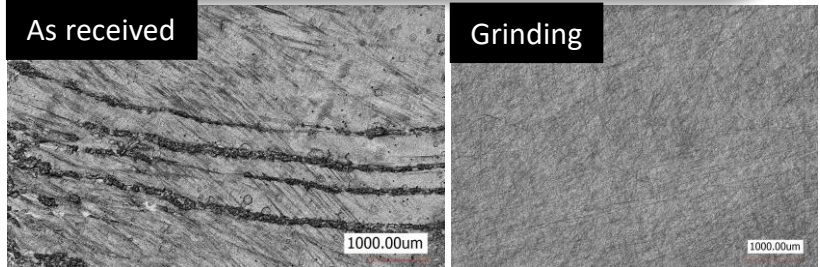
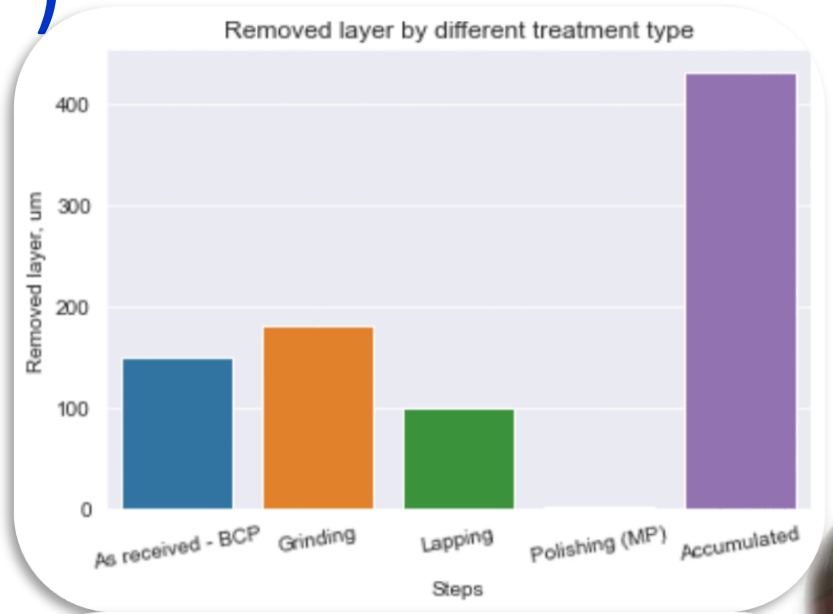
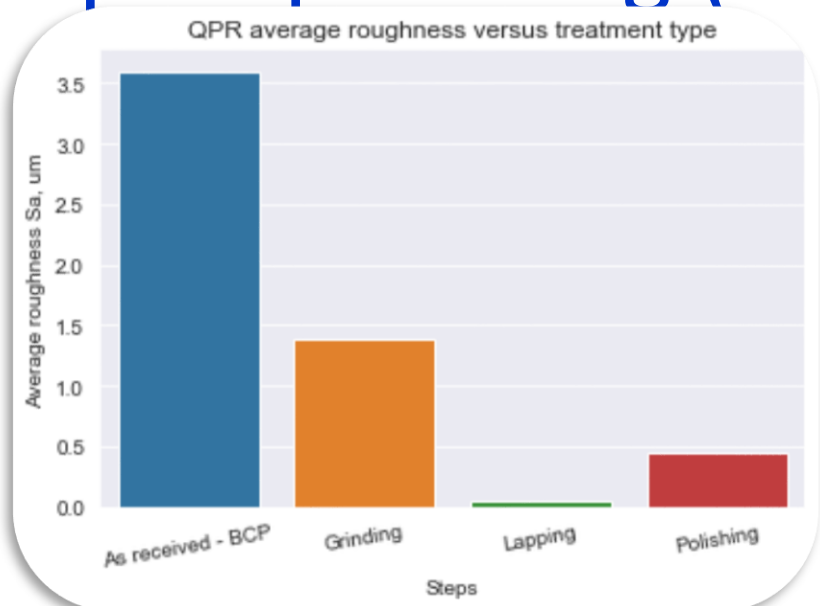
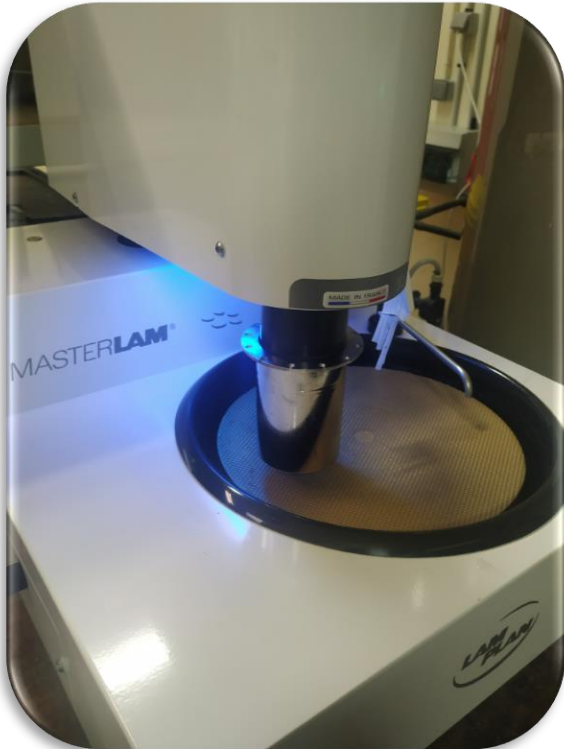
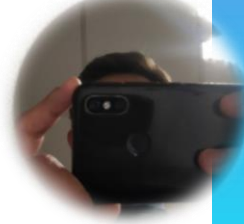
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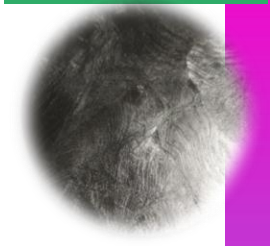
Lapping



Polishing



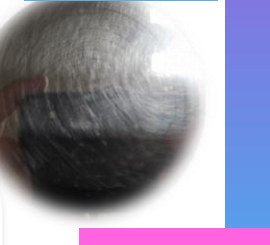
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Grinding



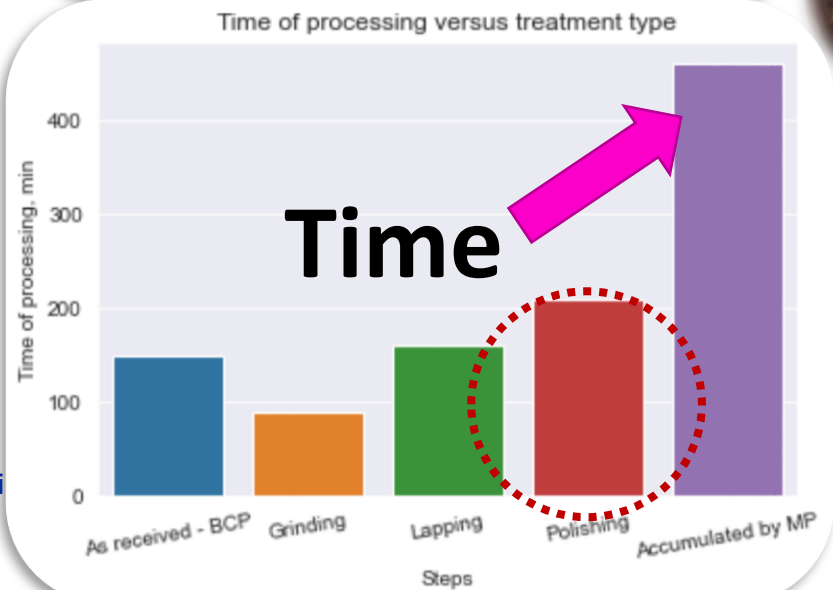
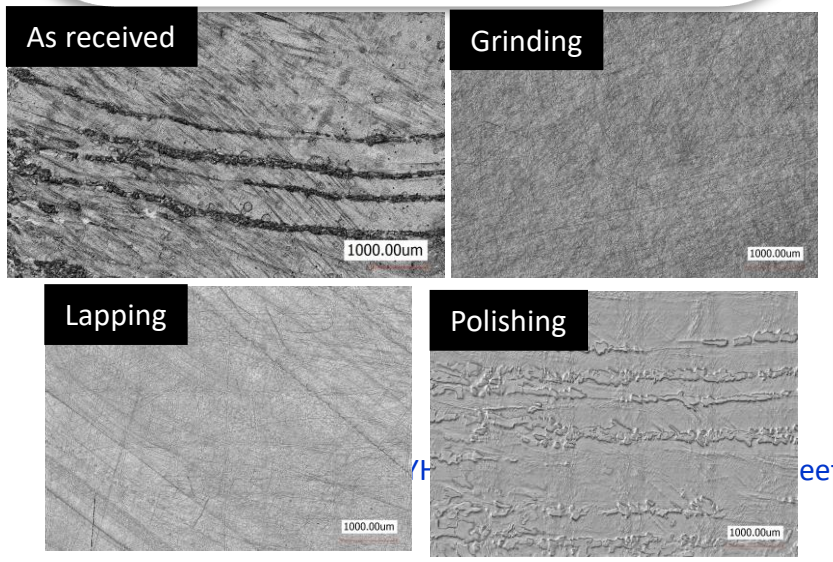
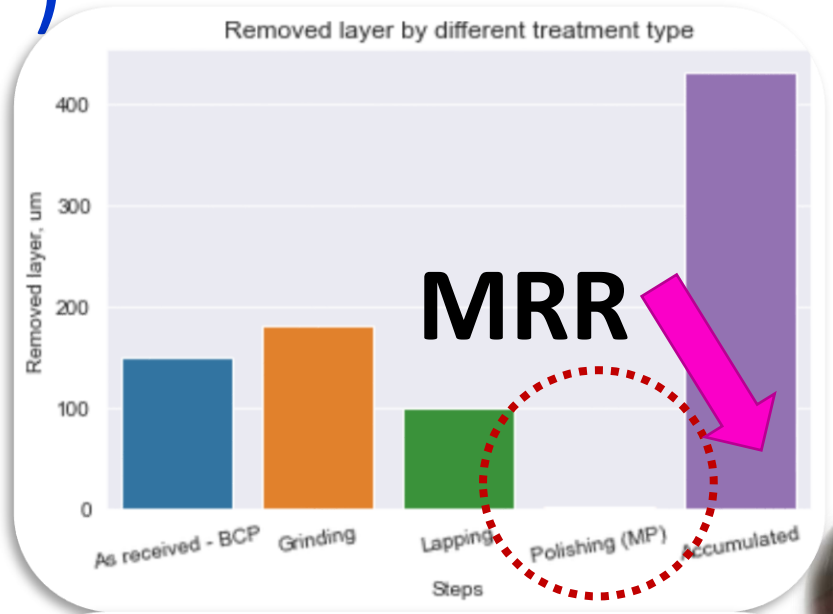
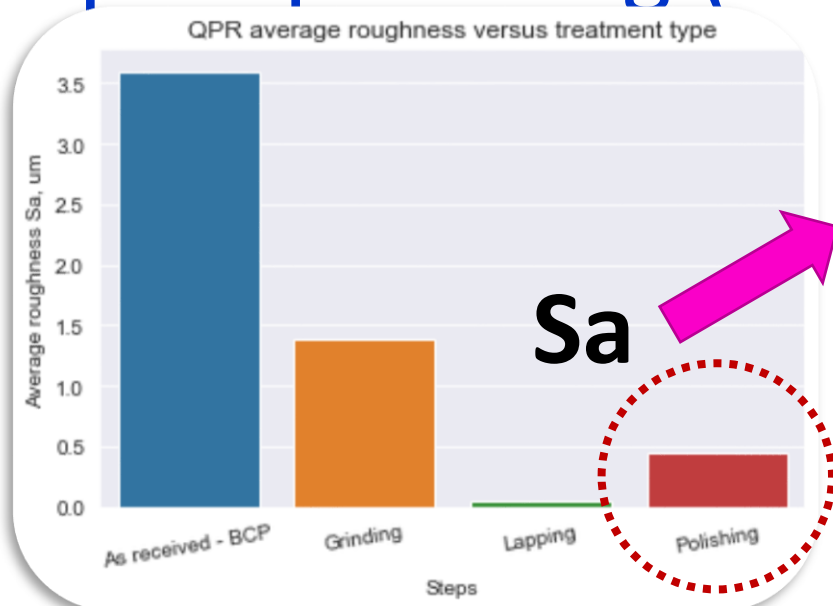
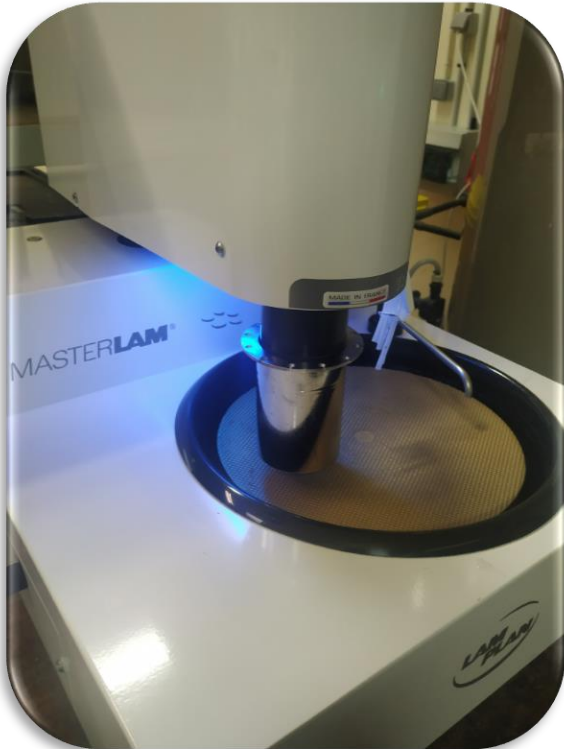
Lapping



Polishing



Metallographic polishing (MP)



Metallographic polishing (MP)

As received



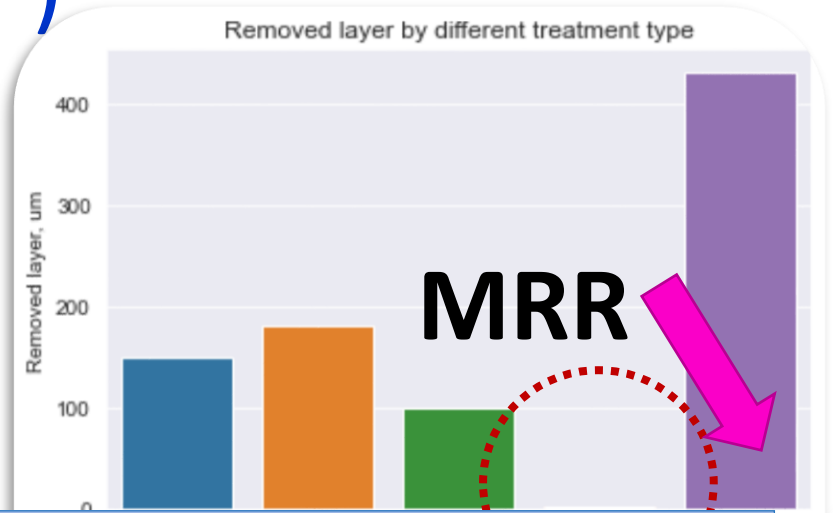
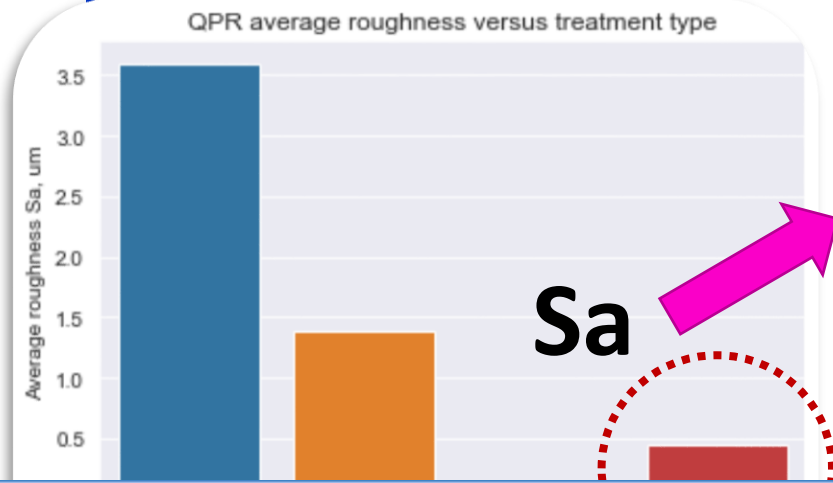
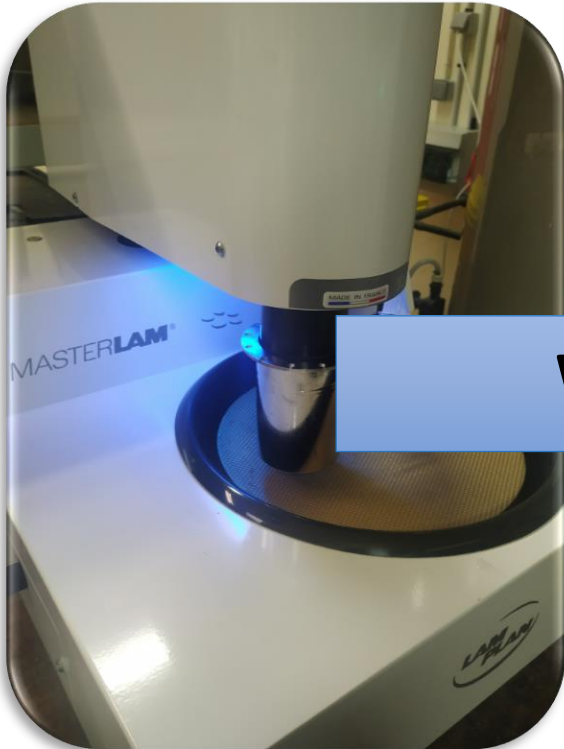
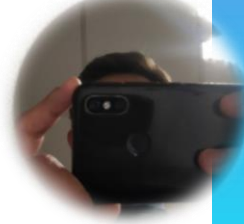
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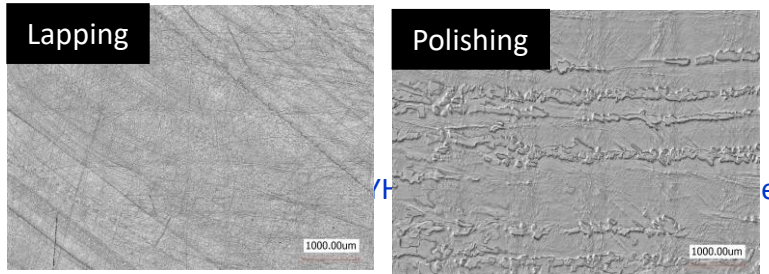
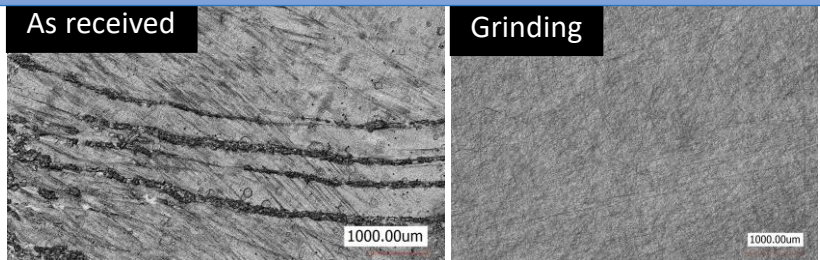
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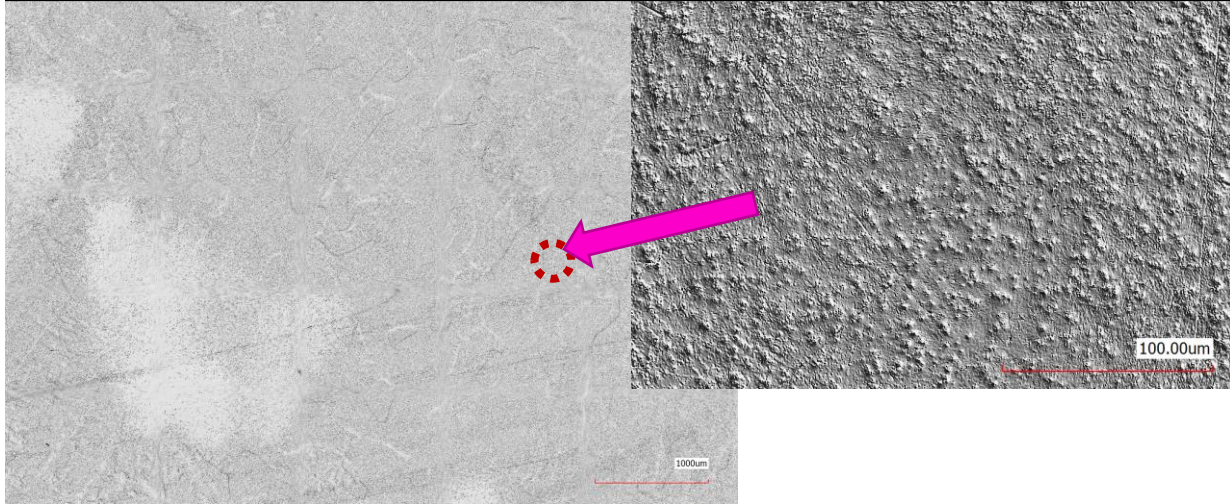


Why polishing step is so important?

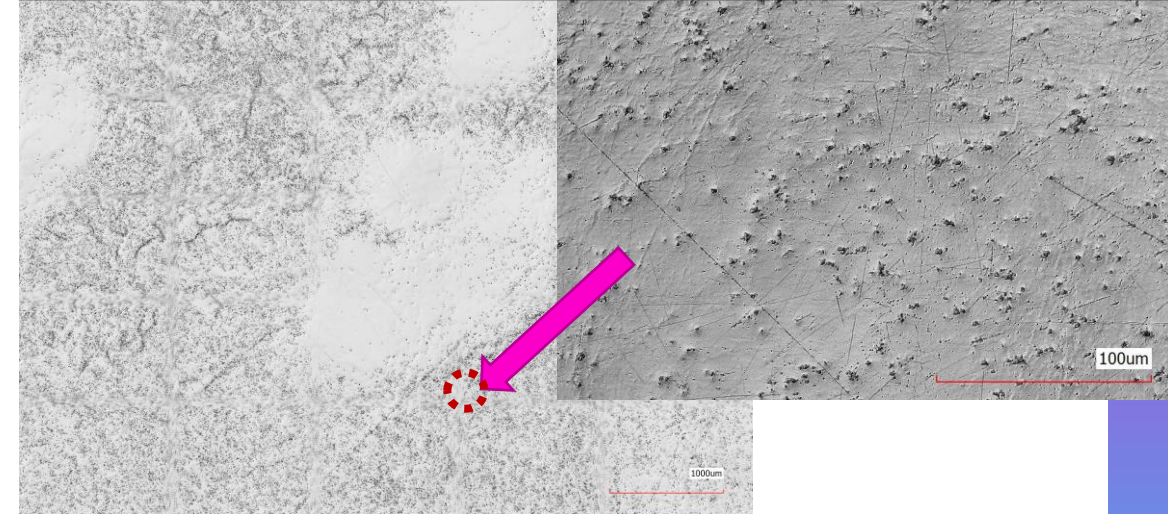


Decontamination processing versus time

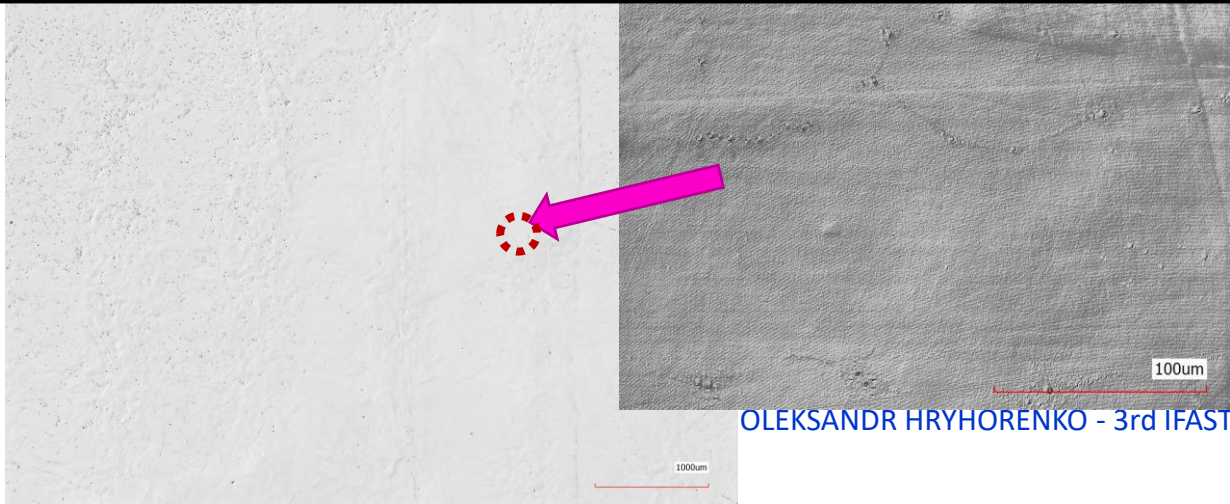
Time: 30 min



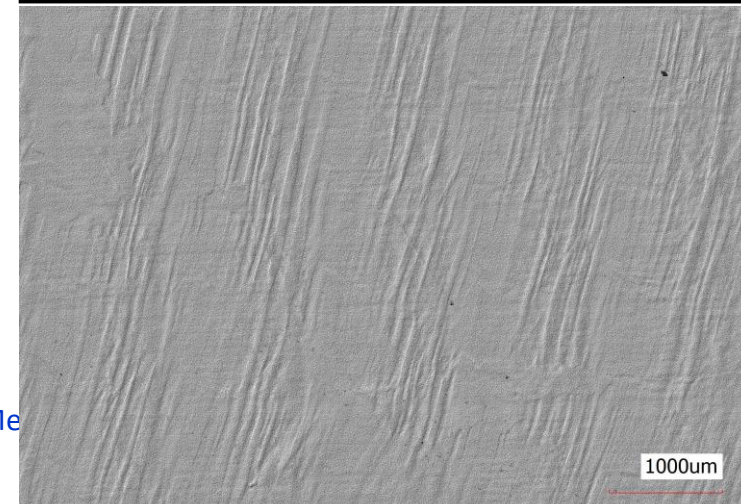
Time: 60 min



Time: 90 min



Time: 120 min



Conclusion & Perspective

- Reduced roughness is obtained by MP ($Sa=0,45 \mu\text{m}$) compare to previous treated QPR ($Sa=1 \mu\text{m}$)
- Polishing is an essential step to obtain a clean surface

Perspectives:

- Evaluate the RF performance at HZB of the QPR sample after MP polishing

iFAST

Thank you for your attention



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