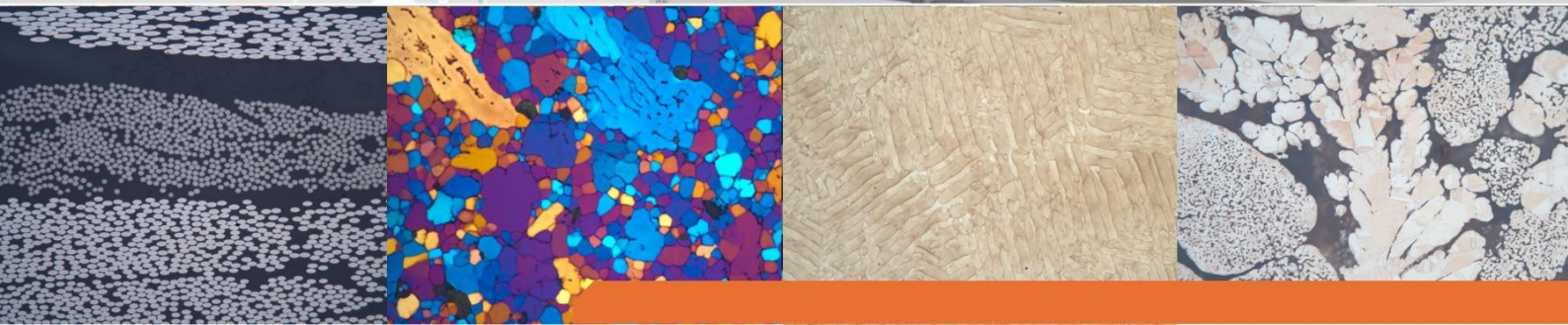


Application lab report

Preparation of AA 7045, Inconel and
maraging steel samples



QATM-Preparation method

Objective:

Three samples need to be prepared (AA 7045, Inconel, Maraging Steel). All cuts were made with the Qcut 250 A. Further preparation was carried out with Qpress 50 and SAPHIR 550. Detailed parameters and pictures can be found in the following report.

QATM-Preparation method

Cutting

 Cutting			
Device	Cut-off disc	Anti-corrosion coolant	Clamping tool
Qcut 250 A	AA 7045: NF-A250SC (95012531) Inconel: FS-E250A (95012525) Maraging steel: FS-E250A (95012525)	QATM – Standard (95014282)	-Qtool 60 (Z2235200) -Cross prism jaw 32 mm (02235213) for Maraging steel sample
Cutting method			
Horizontal cut (X-axis)			
Parameters			
Feed speed	Pulse parameter	Cut-off disc rotational speed	
0,6 mm/s	0,1 / 0,1 mm	3050 RPM	
Notes			
- For the maraging steel we recommend the cross-prism jaw 32mm			

QATM-Preparation method

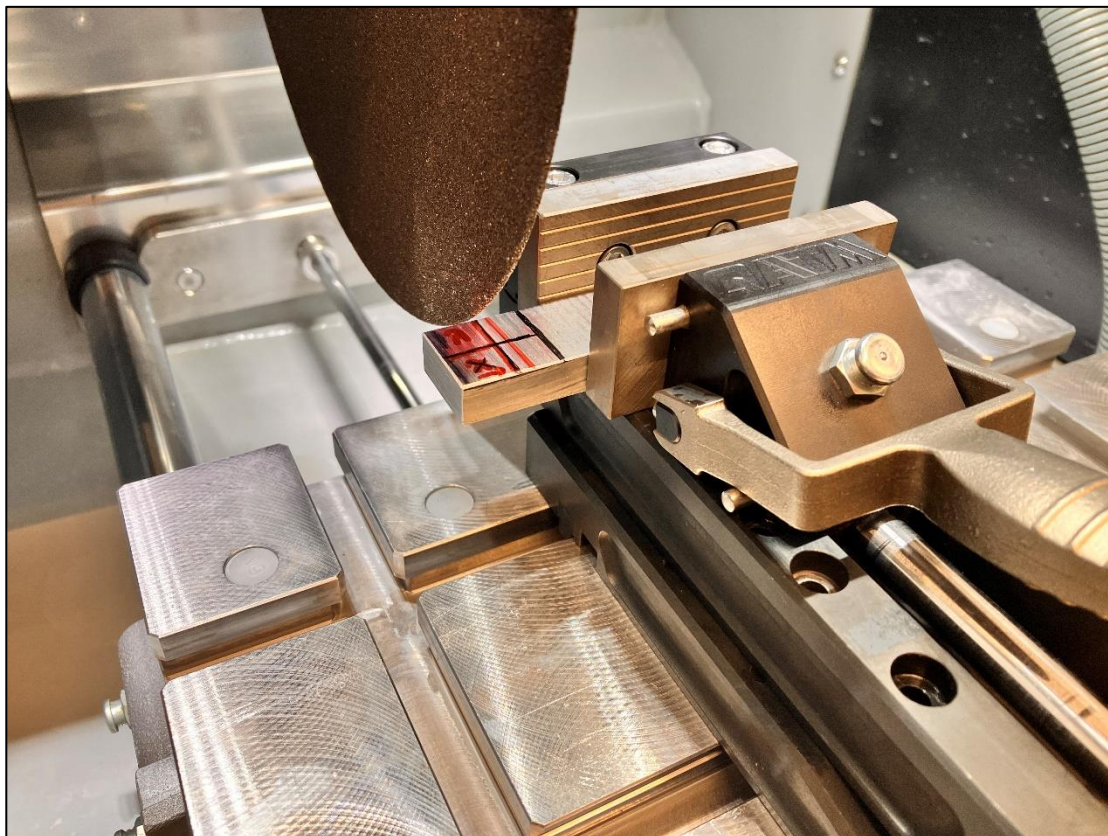


Figure 1: Clamping solution for all samples.

Hot mounting

 Mounting					
Device	Consumable	Heating time	Temperature	Pressure	Cooling time
Qpress 50	Epo black* Duroplast black	6:00 min	185 °C	250 bar	2:00 min
Filler or additional consumables	Heating power	Pressure mode	Cooling power	Ø 40 mm	
*Bakelite black	100 %	From the beginning	100 %		
Notes					
- Time for mounting: 8 minutes					

QATM-Preparation method

Grinding/Polishing – AA 7045

Device	Samples holder	Pressure mode				
SAPHIR 550	6x 30 mm	Central				
Step	MEDIUM		 RPM		 N	 min
 Planar grinding	SiC-Paper P320 self-adhesive + X-Tap	H ₂ O	190	120 ◀▶	20	Till flat
 Grinding	SiC-Paper P600 self-adhesive + X-Tap	H ₂ O	190	120 ◀▶	20	0:45
 Grinding	SiC-Paper P1200 self-adhesive + X-Tap	H ₂ O	190	120 ◀▶	20	0:45
 Polishing	SIGMA	Dia. suspension Poly wb, 3µm Lubricant yellow	120	100 ▶▶	25	5:00
 Fine-polishing	OMEGA	Eposil Non Dry 0,05µm	120	100 ◀▶	20	1:30
 Etching	Sodium hydroxide 7,5%					0:30

Notes

Dosage:

SIGMA 3µm - Diamond suspension 35sec - Lubricant 45sec

OMEGA - Eposil Non Dry 20sec

Microskop:

- Leica DM8000

QATM-Preparation method



Figure 2: AA 7045 – unetched – 200x.

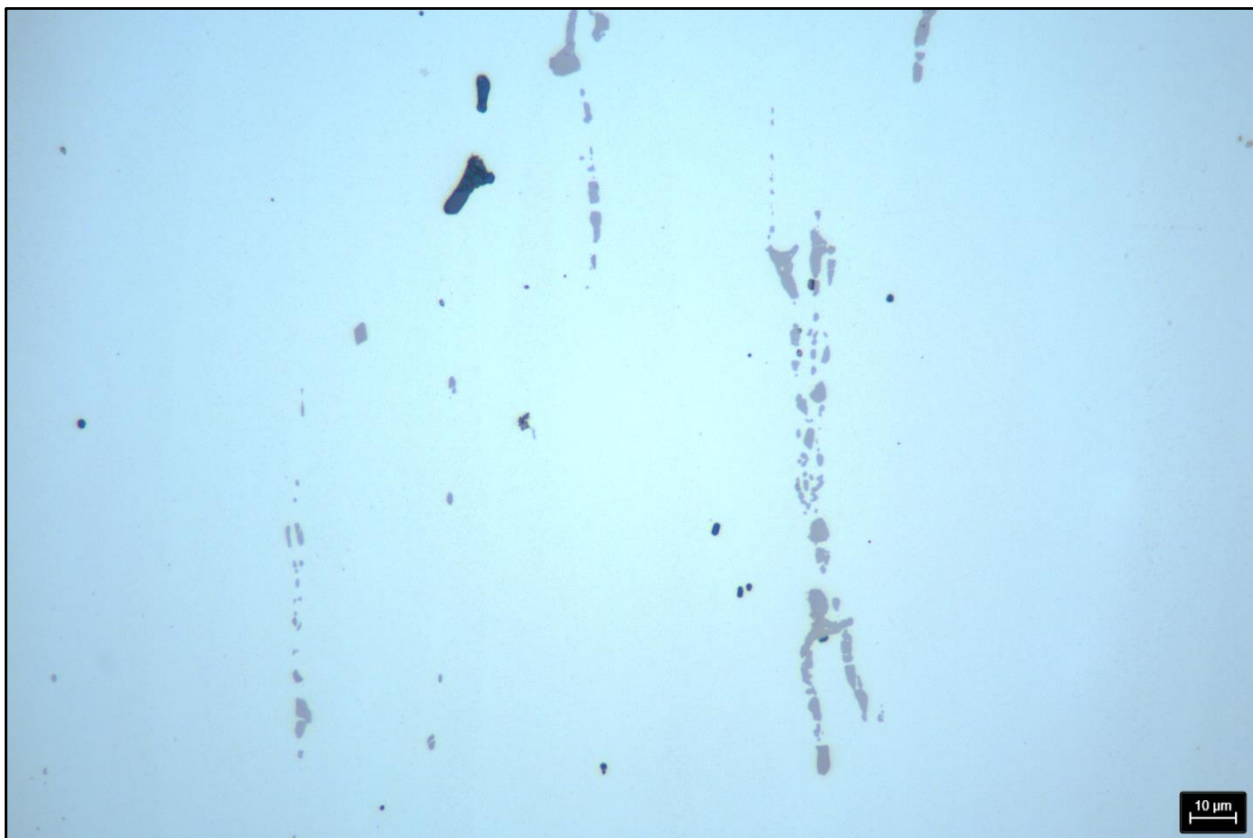


Figure 3: AA 7045 – unetched – 500x.

QATM-Preparation method



Figure 4: AA 7045 – etched – 200x.

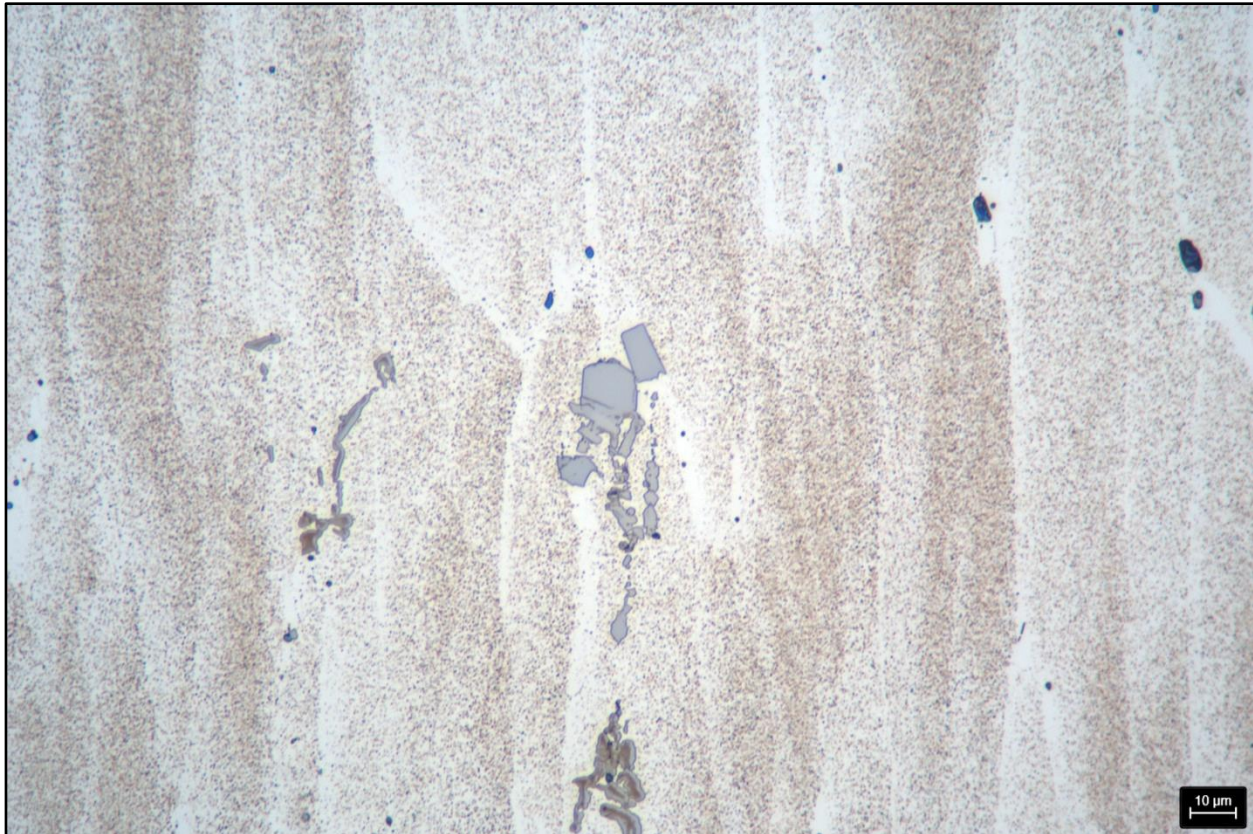


Figure 5: AA 7045 – etched – 500x.

QATM-Preparation method

Grinding/Polishing – Inconel

Device	Samples holder	Pressure mode				
SAPHIR 550	6x 30 mm	Central				
Step	MEDIUM		 RPM		 N	 min
 Planar grinding	SiC-Paper P320 self-adhesive + X-Tap	H ₂ O	190	120 ◀ ▶	25	Till flat
 Polishing	BETA	Dia. suspension Poly wb, 9µm Lubricant yellow	120	100 ◀ ▶	25	4:00
 Polishing	GAMMA	Dia. suspension Poly wb, 3µm Lubricant yellow	120	100 ▶ ▶	30	3:00
 Fine-polishing	OMEGA	Eposil Non Dry 0,05µm	120	100 ◀ ▶	25	1:30
 Etching	V2A-Etchant					0:20 at 60 °C

Notes

Dosage:

BETA 9µm - Diamond suspension 35sec - Lubricant 90sec

SIGMA 3µm - Diamond suspension 35sec - Lubricant 45sec

OMEGA - Eposil Non Dry 20sec

Microskop:

- Leica DM8000

QATM-Preparation method



Figure 6: Inconel – unetched – 100x.

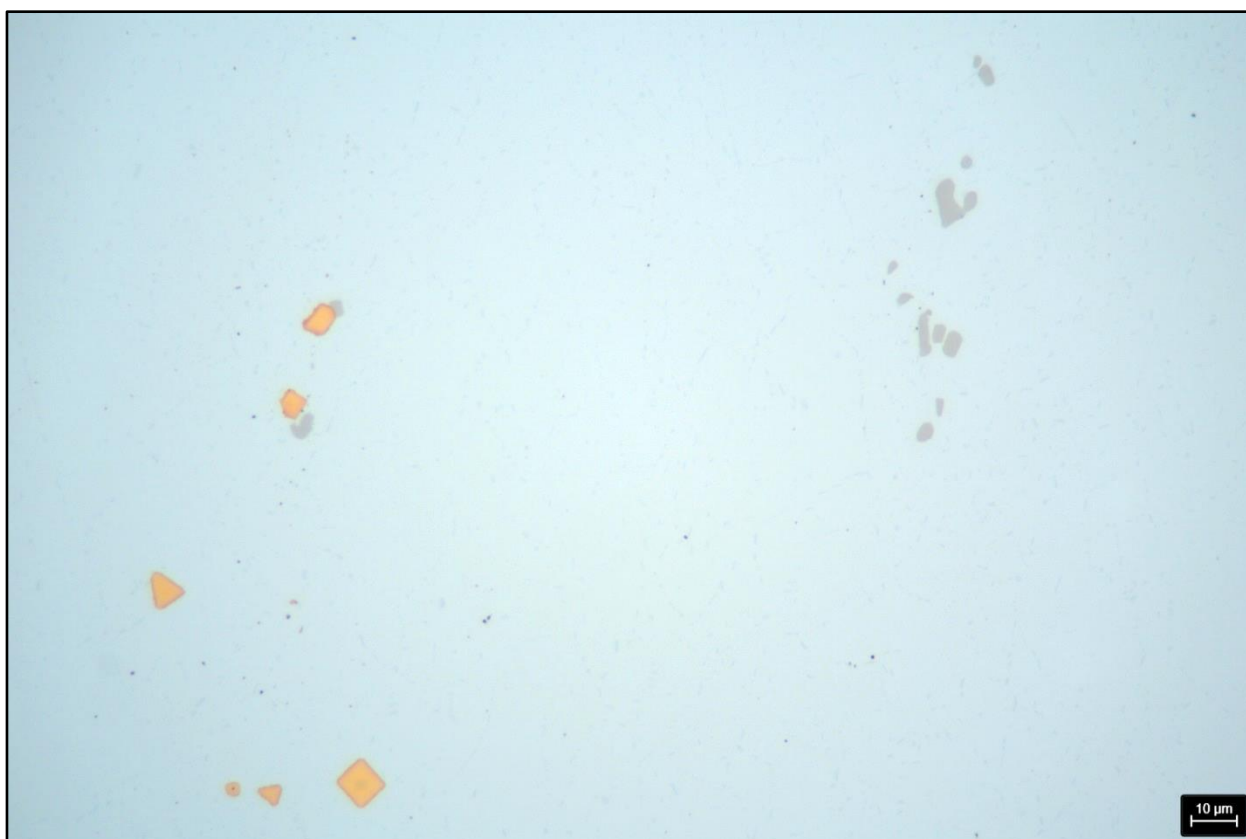


Figure 7: Inconel – unetched – 500x.

QATM-Preparation method

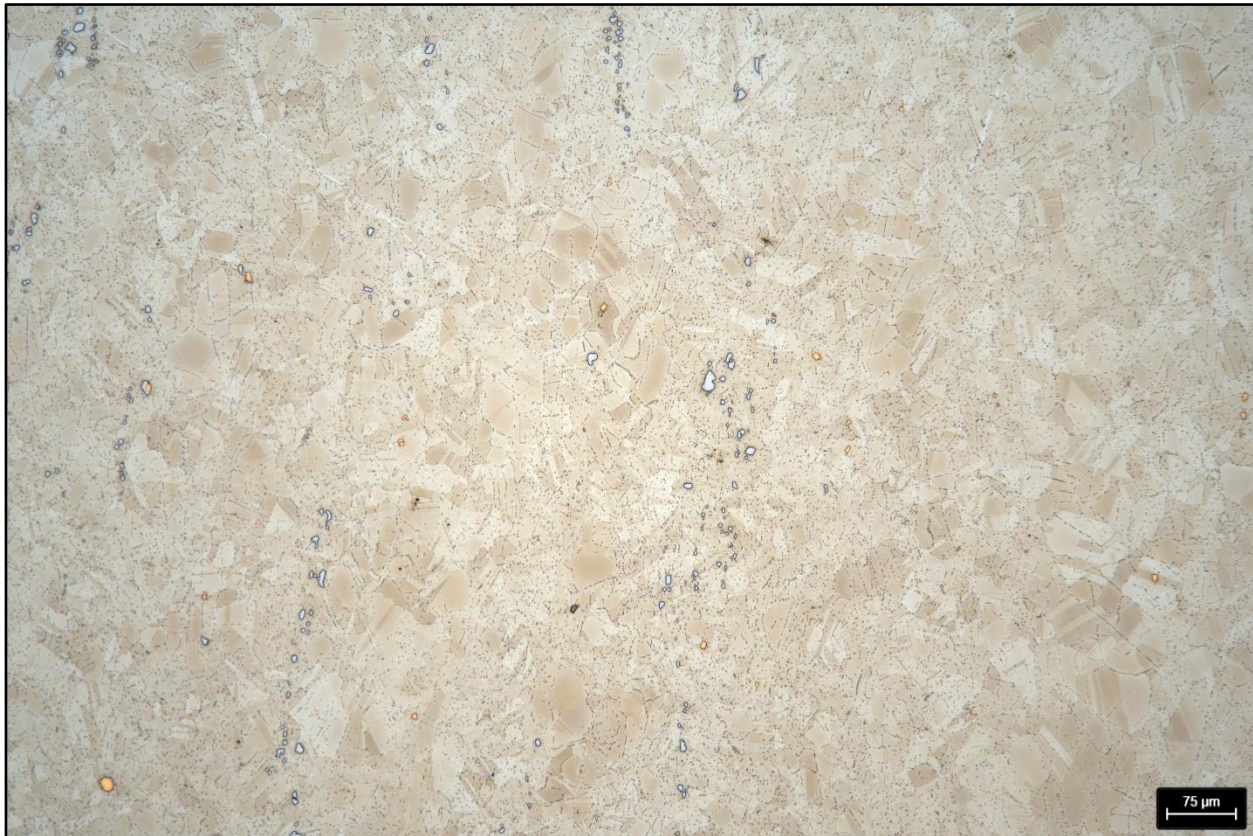


Figure 8: Sample B after etching – 500 x.

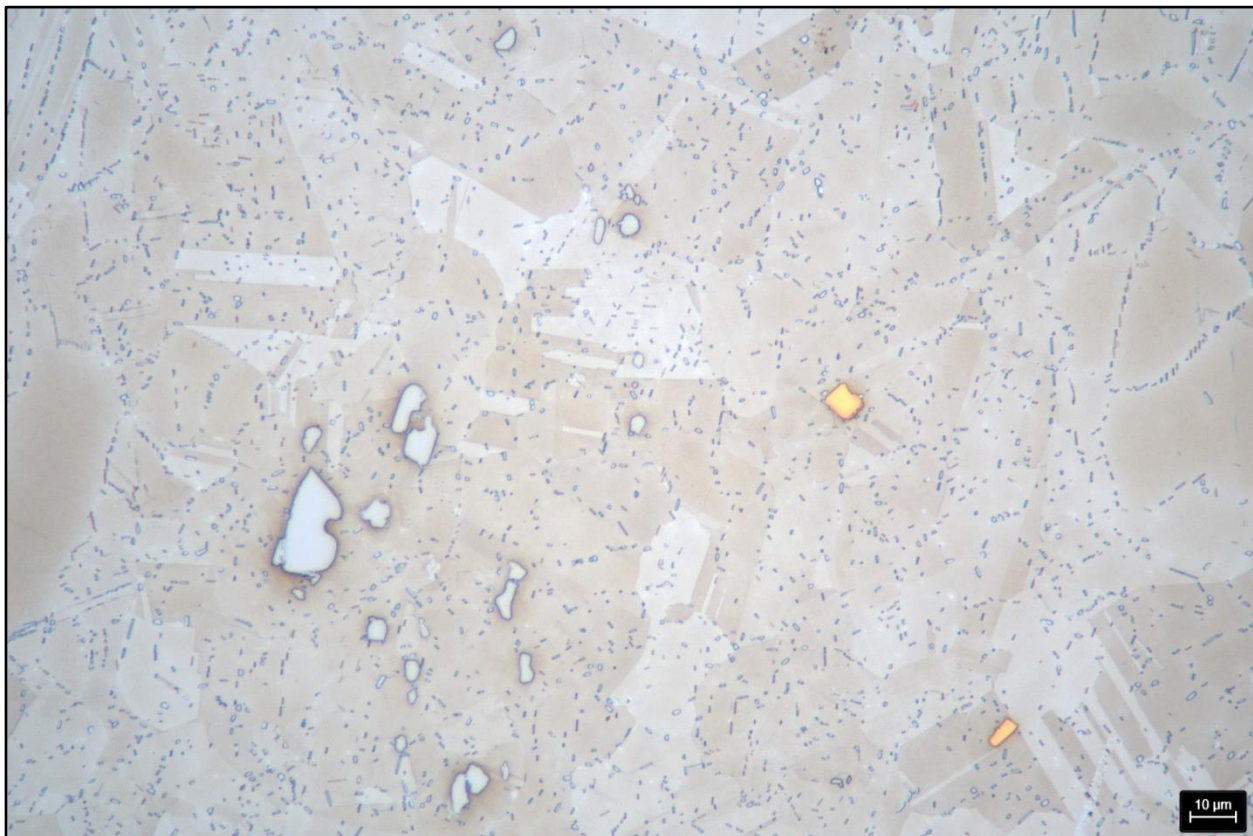


Figure 9: Inconel – etched – 500x.

QATM-Preparation method

Grinding/Polishing – Inconel

Device	Samples holder	Pressure mode				
SAPHIR 550	6x 30 mm	Central				
Step	MEDIUM		 RPM		 N	 min
 Planar grinding	SiC-Paper P320 self-adhesive + X-Tap	H ₂ O	190	120 ◀ ▶	25	Till flat
 Grinding	SiC-Paper P600 self-adhesive + X-Tap	H ₂ O	190	120 ◀ ▶	25	0:45
 Grinding	SiC-Paper P1200 self-adhesive + X-Tap	H ₂ O	190	120 ◀ ▶	25	0:45
 Polishing	SIGMA	Dia. suspension Poly wb, 3µm Lubricant yellow	120	100 ▶ ▶	30	5:00
 Polishing	ZETA	Dia. suspension Poly wb, 1µm Lubricant yellow	120	100 ◀ ▶	25	1:30
 Etching	Nitric acid 3%					0:20

Notes

Dosage:

SIGMA 3µm - Diamond suspension 35sec - Lubricant 45sec

ZETA 1µm - Diamond suspension 35sec - Lubricant 45sec

Microskop:

- Leica DM8000

QATM-Preparation method



Figure 10: Maraging steel – unetched – 100x.



Figure 11: Maraging steel – etched – 100x.