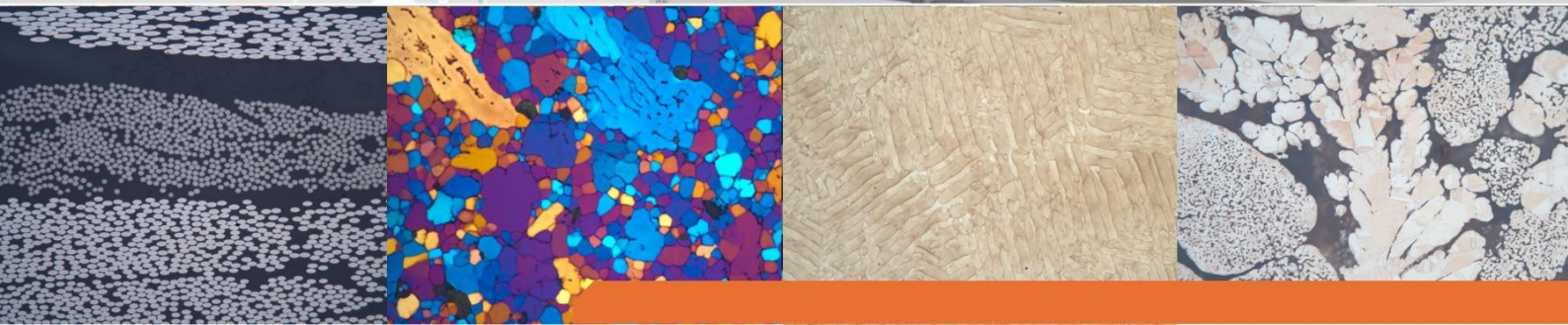


Application lab report

Preparation of Titanium alloys on
Qpol 250 Bot or Qgrind XL + Qpol XL



QATM-Preparation method

Objective:

Two group of alloys (box A and B) have been received and should be prepared once with QPOL 250 Bot and once with the combination of QGRIND XL + QPOL XL to compare the results together.

Hot mounting

	Mounting						
Device		Consumable	Heating time	Temperature	Pressure	Cooling time	
Qpress 50-4		Bakelit	6:00 min	190°C	250 bar	5:00 min	
Filler or additional consumables		Heating power	Pressure mode	Cooling power			
-		100 %	Pressure at the beginning	100 %			
Notes							

Grinding/Polishing

QATM-Preparation method

Device	Sample holder	Pressure mode					
QPOL 250 Bot	6 x 40 mm Z5445025	Central 6 Samples					
Step	MEDIUM		 RPM	 N	 min		
 Planar grinding	VEGA 75 µm	H ₂ O	200	120 ▶▶	120 N	Till flat	
Cleaning: Water: 15 s Ethanol: 8 s Compressed air : 15 s, 20 rpm							
 Pre-polishing	BETA	Dia Suspension Wb. Poly, 9µm + alc. Lubricant	150	120 ◀▶	180 N	7:00	
Cleaning: Water: 20 s Ethanol: 8 s, 20 rpm Ultrasonic: 30 s, 30 rpm							
 Polishing	DELTA	Dia Suspension Wb. Poly, 3µm + alc. Lubricant	150	120 ▶▶	150 N	5:00	
Cleaning: Water: 15 s Ethanol: 8 s Compressed air : 15 s, 20 rpm							
 Final polishing	OMEGA	Eposil F 0,1µm	100	80 ◀▶	120 N	3:00	
Cleaning: Water: 15 s Ethanol: 8 s, 20 rpm							
Ultrasonic bath: 45 s, 30 rpm; heating: OFF							
Cleaning: Water: 15 s Ethanol: 8 s Compressed air : 15 s, 20 rpm							
 Etching (chem.)	Etchant V2A Adler					2:00 min 0:10 min	

Notes

- It took 3:00 minutes for Sample A and 5:00 minutes for Sample B until the samples were flat.
- Pre-dosing for 9 µm and 3 µm: 4 s
Dosing interval and dosing duration for Dia. Suspension 9 µm and 3µm: Every 30 s for 1,5 s
- Dosing interval and dosing duration for lubricant: Every 60 s for 1,8 s
- Pre-dosing time for fine polishing suspension 0,1 µm = 2 s

QATM-Preparation method

- Dosing interval and Dosing duration for fine polishing suspension:
Every 15 s for 0,8 s
 - Rinsing time for fine polishing: the last 30 s with H₂O
-

QATM-Preparation method



Figure 1: The microstructure of the sample at the edge after final polishing – 100 x. Box A.

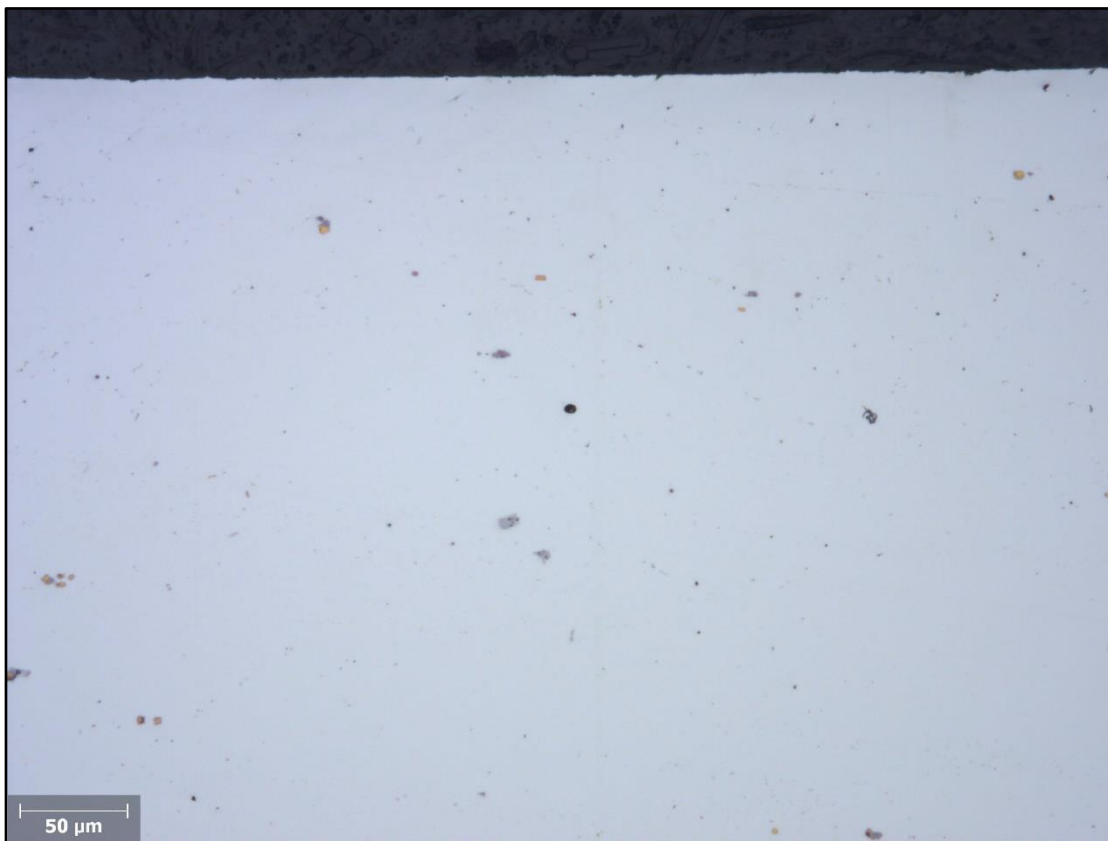


Figure 2: Figure 1 in higher magnification– 200 x. Box A.

QATM-Preparation method

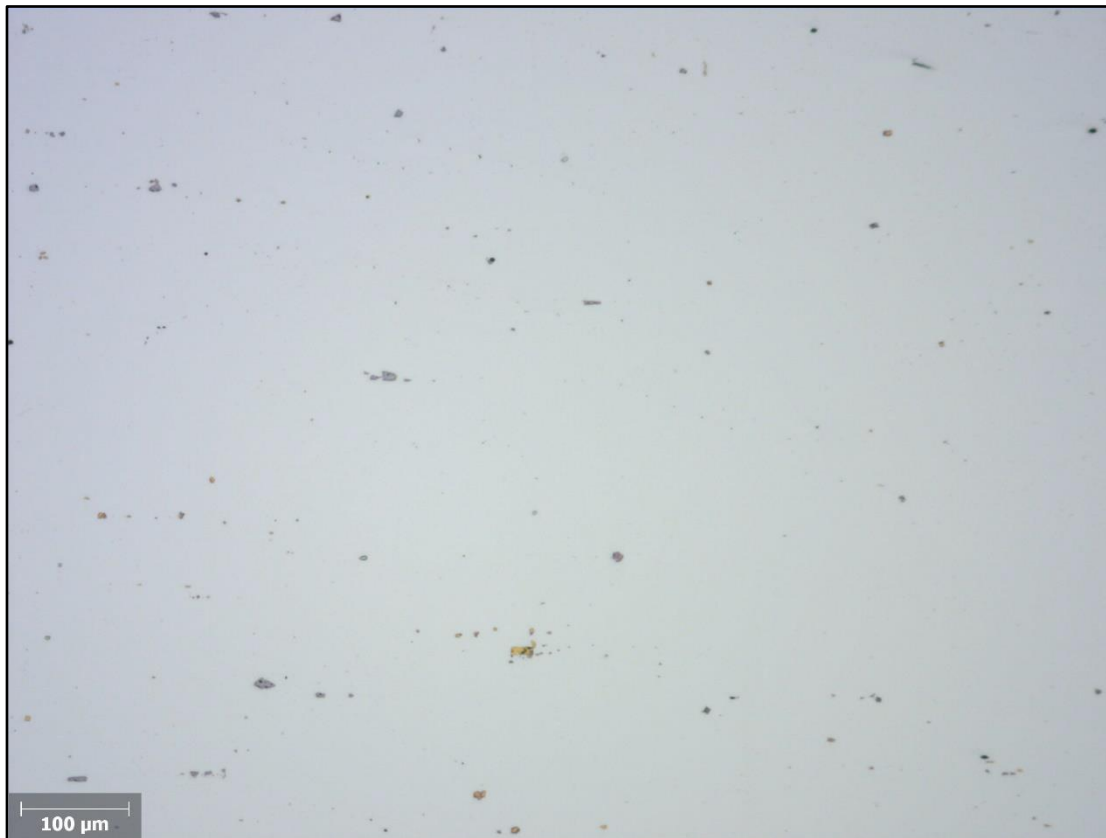


Figure 3: The microstructure of the sample at the core after final polishing – 100 x. Box A.



Figure 4: Figure 3 in higher magnification – 200 x. Box A.

QATM-Preparation method



Figure 5: Figure 3 in higher magnification – 500 x. Box A.



Figure 6: The microstructure after etching with Adler for 10 seconds – 100 x. Box A.

QATM-Preparation method



Figure 7: The microstructure after etching with Adler for 10 seconds – 200 x. Box A.

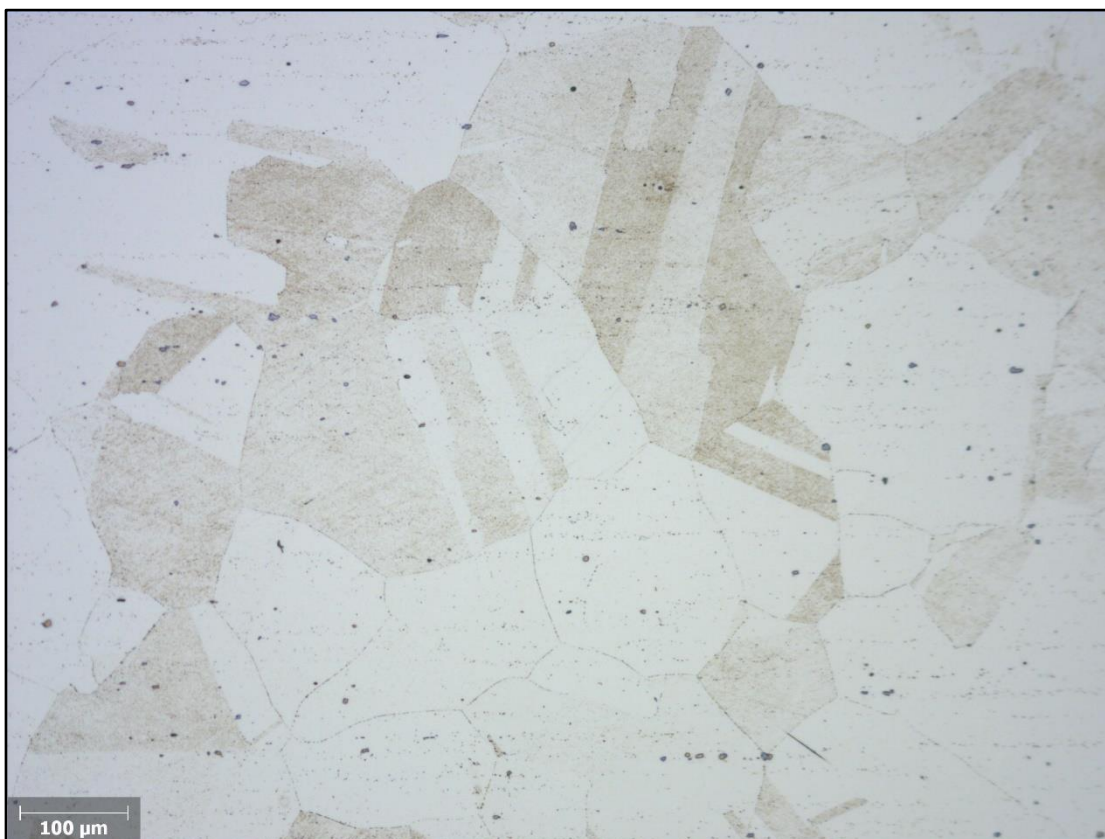


Figure 8: The microstructure after etching with V2A at room temp. for 2 minutes – 100 x. Box A.

QATM-Preparation method



Figure 9: The microstructure after final polishing– 100 x. Box B.



Figure 10: The microstructure after final polishing– 200 x. Box B.

QATM-Preparation method

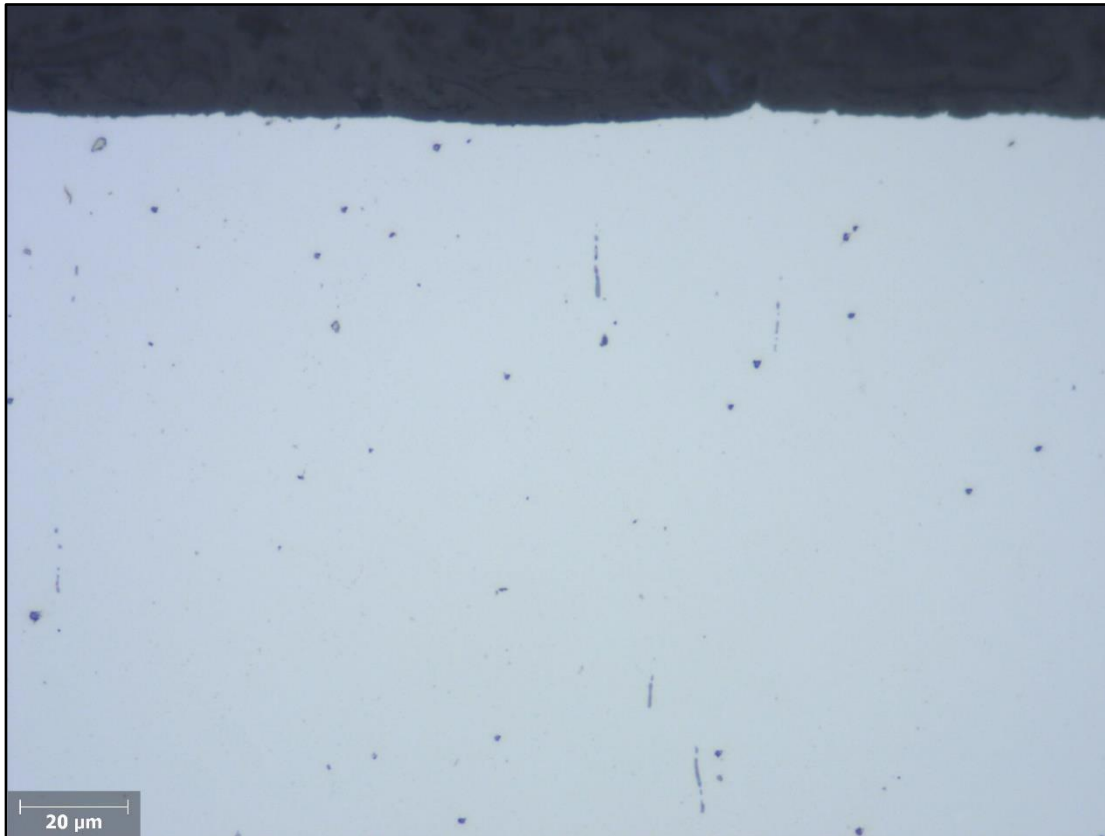


Figure 11: Figure 10 with higher magnification – 500 x. Box B.



Figure 12: The microstructure after etching with Adler for 3 seconds – 100 x. Box B.

QATM-Preparation method



Figure 13: The microstructure after etching with Adler for 3 seconds – 200 x. Box B.



Figure 14: The microstructure after etching with Adler for 3 seconds at core region – 200 x. Box B.

QATM-Preparation method

Grinding/Polishing

Device	Sample holder	Pressure mode				
QGRIND XL + QPOL XL	Z5803086 6 × ø 40 mm	Central 6 Samples				
Step	MEDIUM		 RPM	 N	 min	
 Planar grinding	SiC-Stone	H ₂ O	200	120 ◀ ▶	180 N	0.5 mm in 1 min
Cleaning: Water: 15 s Ethanol: 8 s Compressed air : 15 s, 20 rpm						
 Grinding	VEGA 75 µm	H ₂ O	200	120 ▶ ▶	120 N	1:00
 Pre-polishing	BETA	Dia Suspension Wb. Poly, 9µm + alc. Lubricant	150	120 ◀ ▶	180 N	6:00
 Polishing	DELTA	Dia Suspension Wb. Poly, 3µm + alc. Lubricant	150	120 ▶ ▶	150 N	5:00
 Final polishing	OMEGA	Eposil F 0,1µm	100	80 ◀ ▶	120 N	3:00
 Etching (chem.)	Etchant V2A Adler					2:00 min 0:10 min

Notes

- Pre-dosing for 9 µm and 3 µm: 4 s
Dosing interval and dosing duration for Dia. Suspension 9 µm and 3µm:
Every 30 s for 1,5 s
- Dosing interval and dosing duration for lubricant:
Every 60 s for 1,8 s
- Pre-dosing time for fine polishing suspension 0,1 µm = 2 s
- Dosing interval and Dosing duration for fine polishing suspension:
Every 15 s for 0,8 s
- Rinsing time for fine polishing: the last 30 s with H₂O
- Etching at 50 °C

QATM-Preparation method

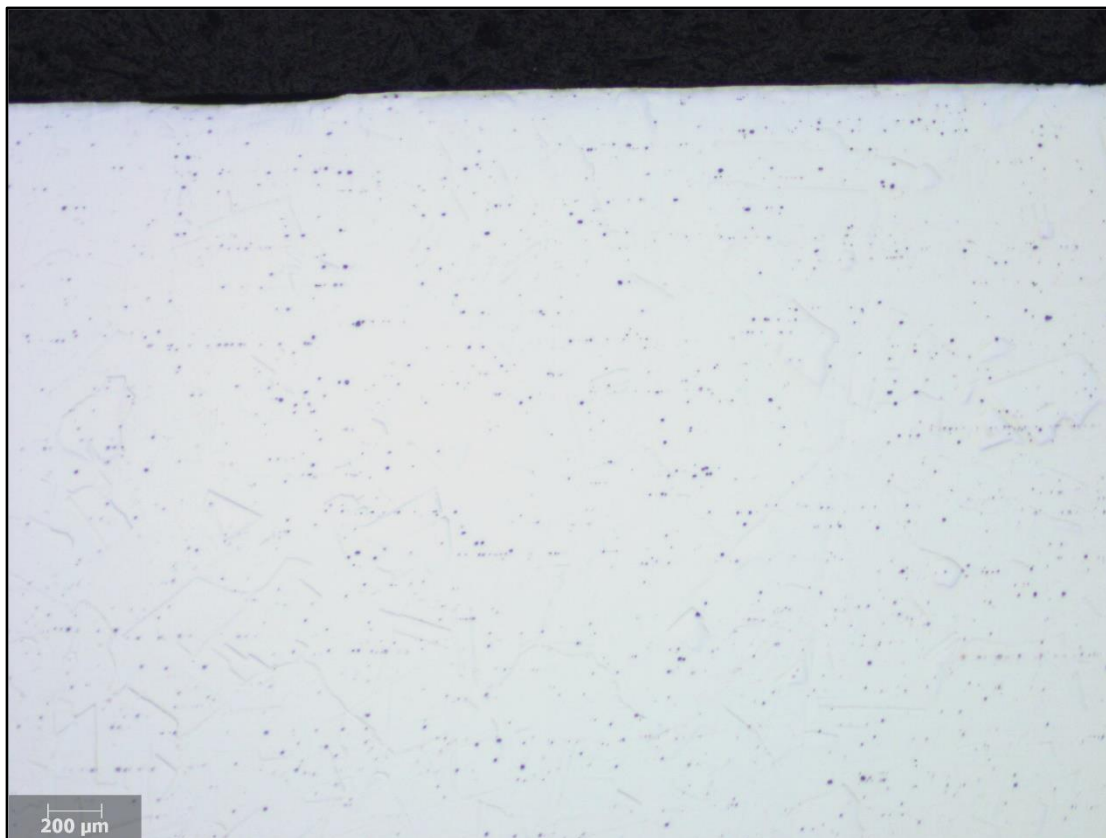


Figure 15: The microstructure after final polishing – 25 x. Box A.



Figure 16: Figure 15 with higher magnification– 200 x. Box A.

QATM-Preparation method



Figure 17: Microstructure after etching for 150 s with V2A at 50 °C - 25 x. Box A.



Figure 18: Figure 17 with higher magnification - 100 x. Box A.

QATM-Preparation method



Figure 19: The edge region of the sample after final polishing – 100 x. Box B.



Figure 20: Figure 19 with higher magnification – 200 x. Box B.

QATM-Preparation method



Figure 21: The edge region of the sample after final polishing – 500 x. Box B.



Figure 22: The microstructure of the sample after etching for 80 s with V2A at 50 °C – 100 x. Box B.

QATM-Preparation method



Figure 23: Figure 22 with higher magnification – 200 x. Box B.



Figure 24: The microstructure at the core region after etching – 200 x. Box B.