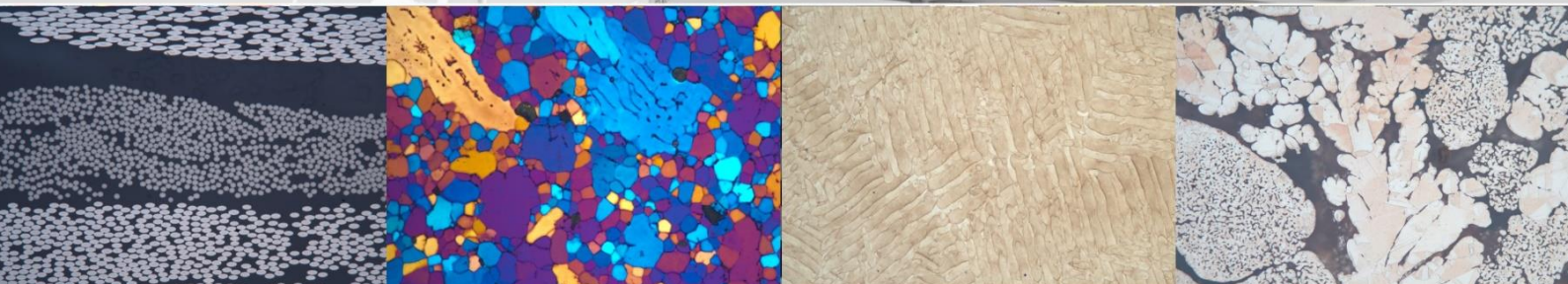


Application lab. report

Metallographic preparation of Ti64 screw



QATM-Preparation method

Objective:

One specimen has been received. The specimen is to be cut with the Qcut 200 A, mounted with the Opal 410 and prepared with the Qpol 300 A1 Eco+. The microstructure of the screw will be investigated. Detailed parameters and images will follow in the report.

QATM-Preparation method

Cutting

 Cutting			
Device	Cut-off disc	Anti-corrosion coolant	Clamping tool
Qcut 200 A	92004998	Coolant Standard	- Fast Lock Vice 60 Z2235001 - Easy Clamping Base M Z2236008
Cutting method			
Automatic horizontal cutting method (with Y-Axis)			
Parameters			
Feed speed	Pulse parameter	Cut-off disc rotational speed	
0,05 mm/s	Without Pulse	3500 RPM	
Notes			

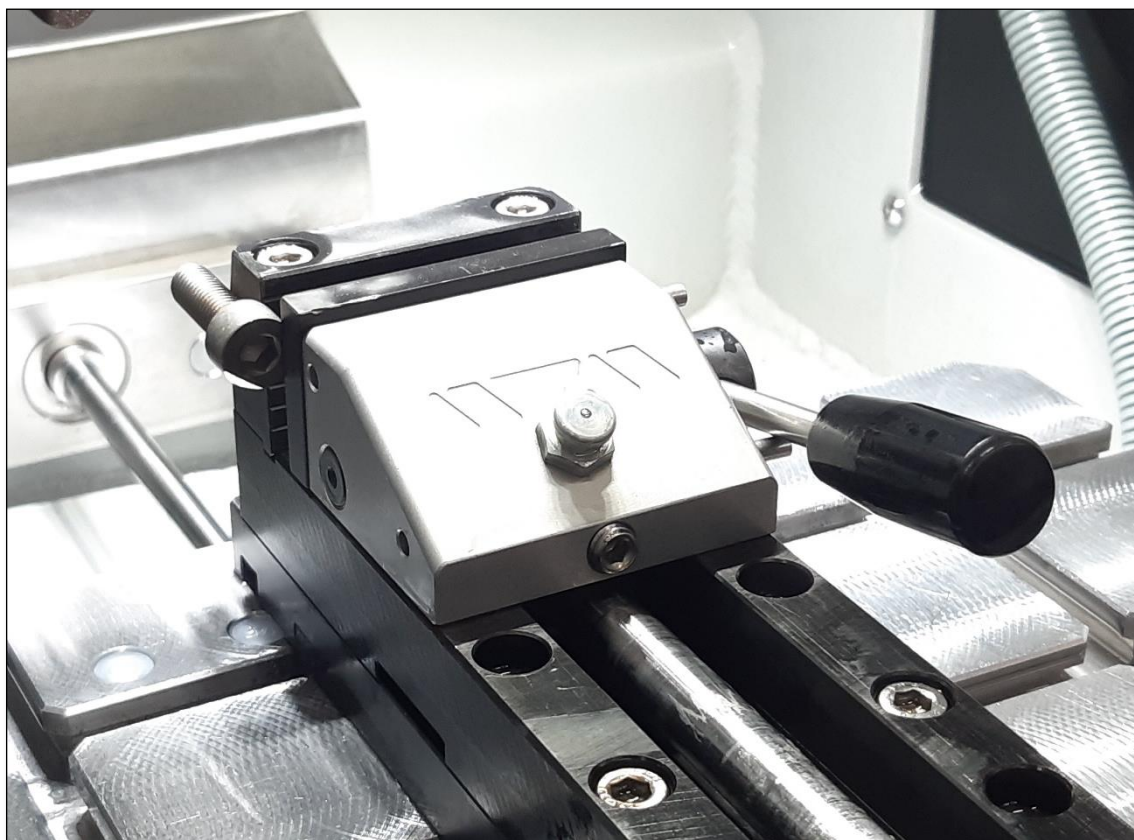


Figure 1: As-received specimen (already clamped).

QATM-Preparation method

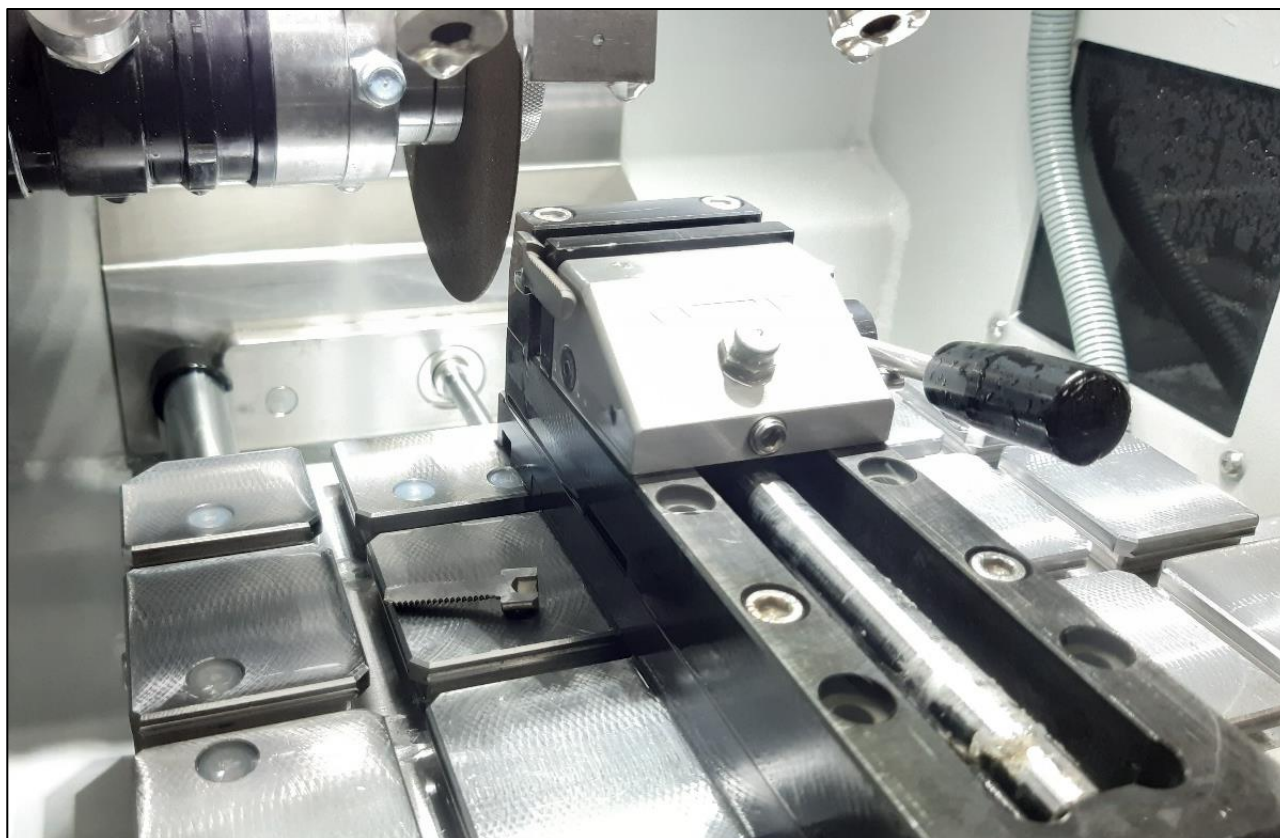


Figure 2: Overview of the screw after horizontal cutting method.

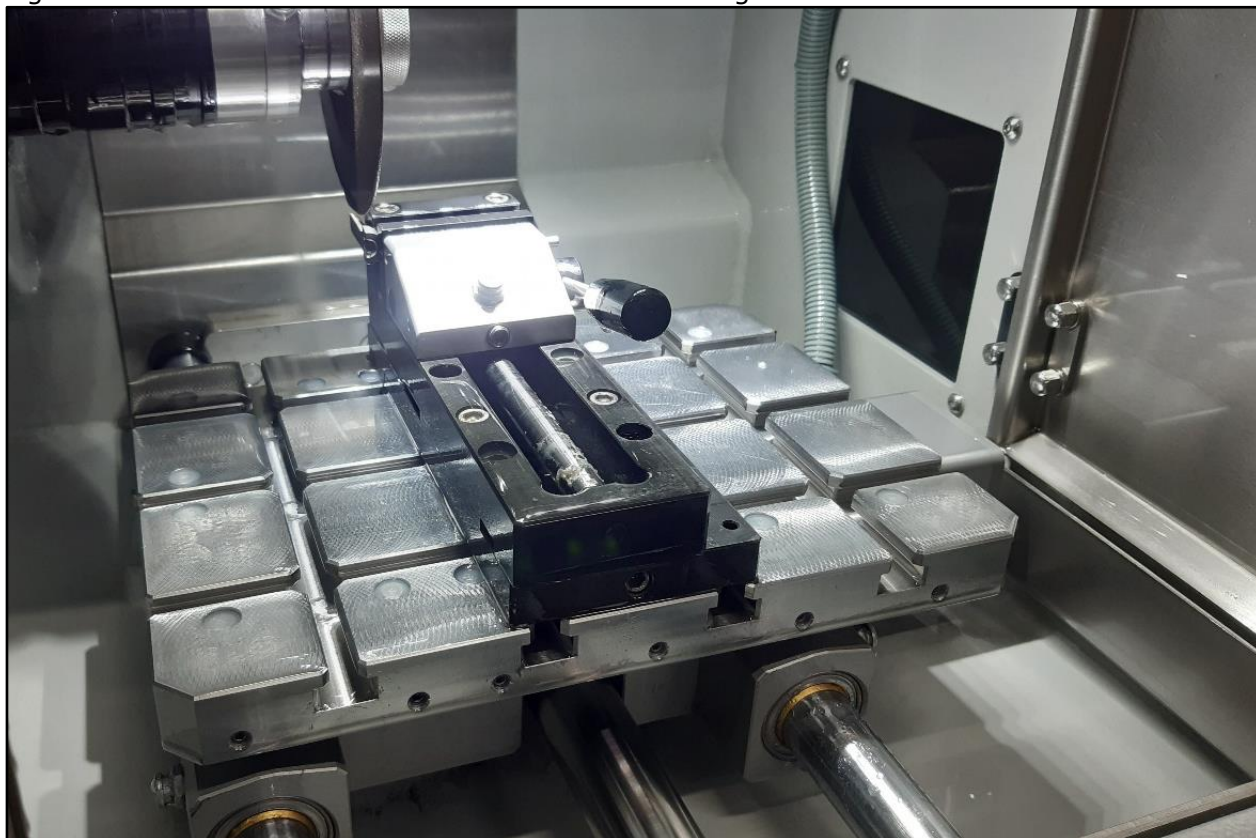


Figure 3: Overview of the screw after vertical cutting method.

QATM-Preparation method

Hot mounting

 Mounting					
Device	Consumable	Heating time	Temperature	Pressure	Cooling time
Opal 410	Duroplast black	5:00	190°C	6 (180bar)	5:00
Filler or additional consumables	Heating power	Pressure mode	Cooling power		
-	100 %	-	100 %		
Notes					
- we recommend using approx. 25 g Duroplast black for one sample ø 40 mm					



Figure 4: Overview of the mounting process with Opal 410.

QATM-Preparation method

Grinding/Polishing

Device	Samples holder	Pressure mode					
Qpol 300 A1 Eco+	Z5446025	Single					
Step	MEDIUM		 RPM	 N	 min		
 Planar grinding	Galaxy green	H ₂ O	SH = 120 WP = 250	◀ ▶	30	Till flat Approx. 3:00	
 Pre-Polishing	BETA	Diamond susp. Poly, 9 µm	SH = 120 WP = 250	▶ ▶	30	6:00	
 Fine polishing	OMEGA	Eposil F 0,1 µm + H ₂ O ₂	SH = 75 WP = 90	◀ ▶	35	6:00 – 12:00 (H ₂ O the last 0:20)	
 Etching (chem.)	Etchant Kroll					0:30	

Notes

- SH = rpm for sample holder
- WP = rpm for working plate
- pre-dosing time for 9 µm = 3 s
- dosing interval and dosing time for 9 µm = every 40 s for 1,5 s
- pre-dosing time for Eposil F 0,1 µm = 2 s
- dosing interval and dosing time for Eposil F 0,1 µm = every 25 s for 1,0 s
- mixture ration for Eposil F and hydrogen peroxide 35% pure = 5:1
- recommendation: to remove the deformation on the sample surface faster – do fine-polishing for 6 minutes, etch the sample for 30 s with etchant Kroll and repeat the step with fine-polishing.

QATM-Preparation method

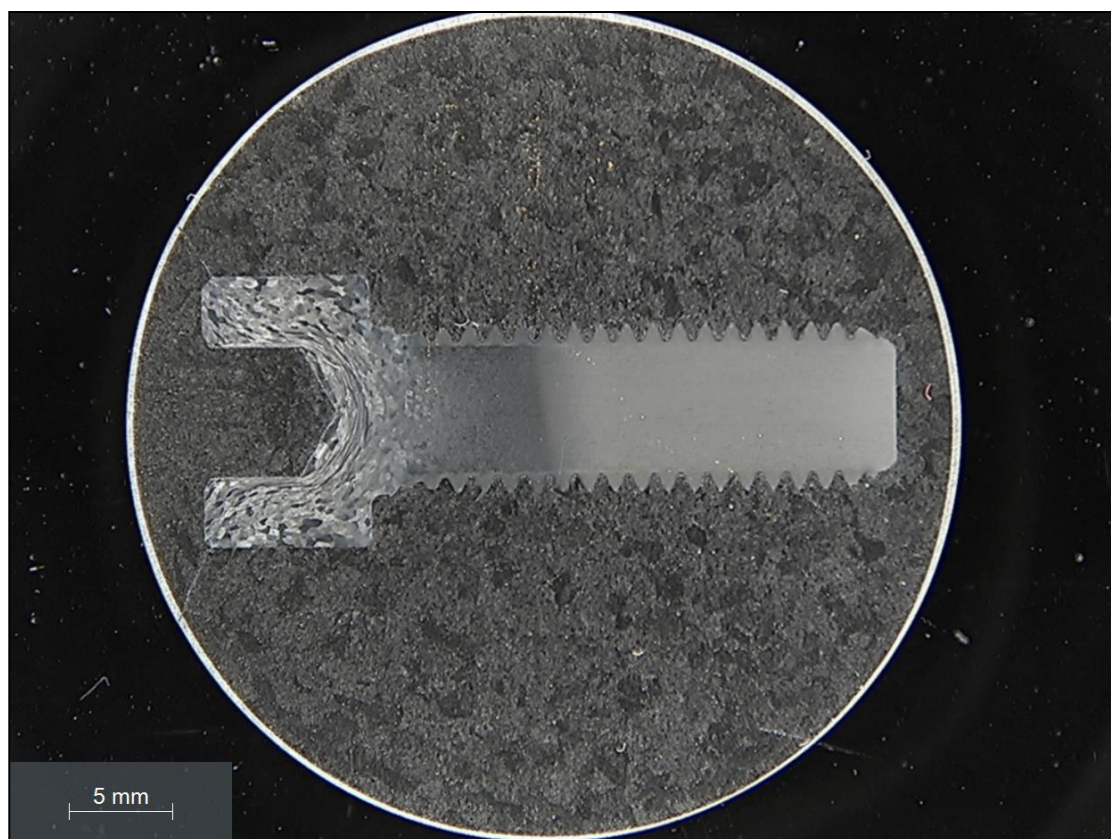


Figure 11: Overview of the polished and etched sample – 1,5 x.



Figure 5: Sample 1 - thread area after fine-polishing – 50 x.

QATM-Preparation method

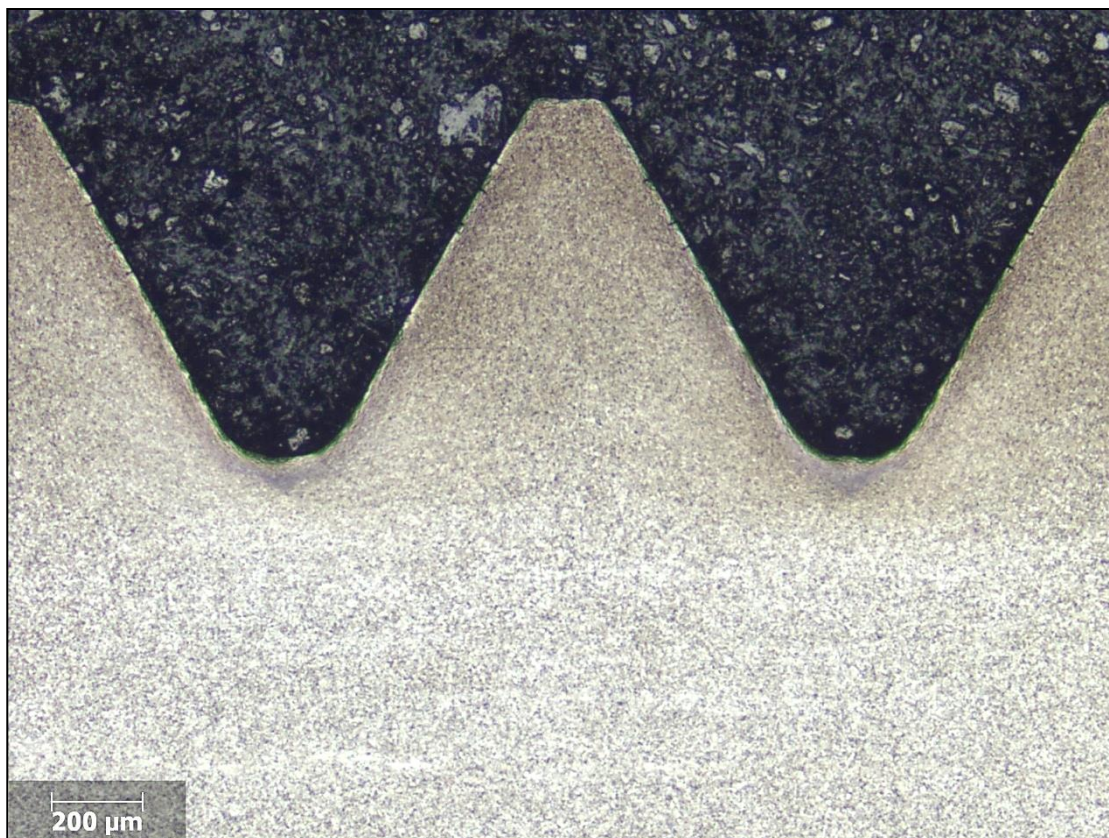


Figure 6: Sample 1 - thread area after fine-polishing and etching with Kroll for 30 s – 50 x.

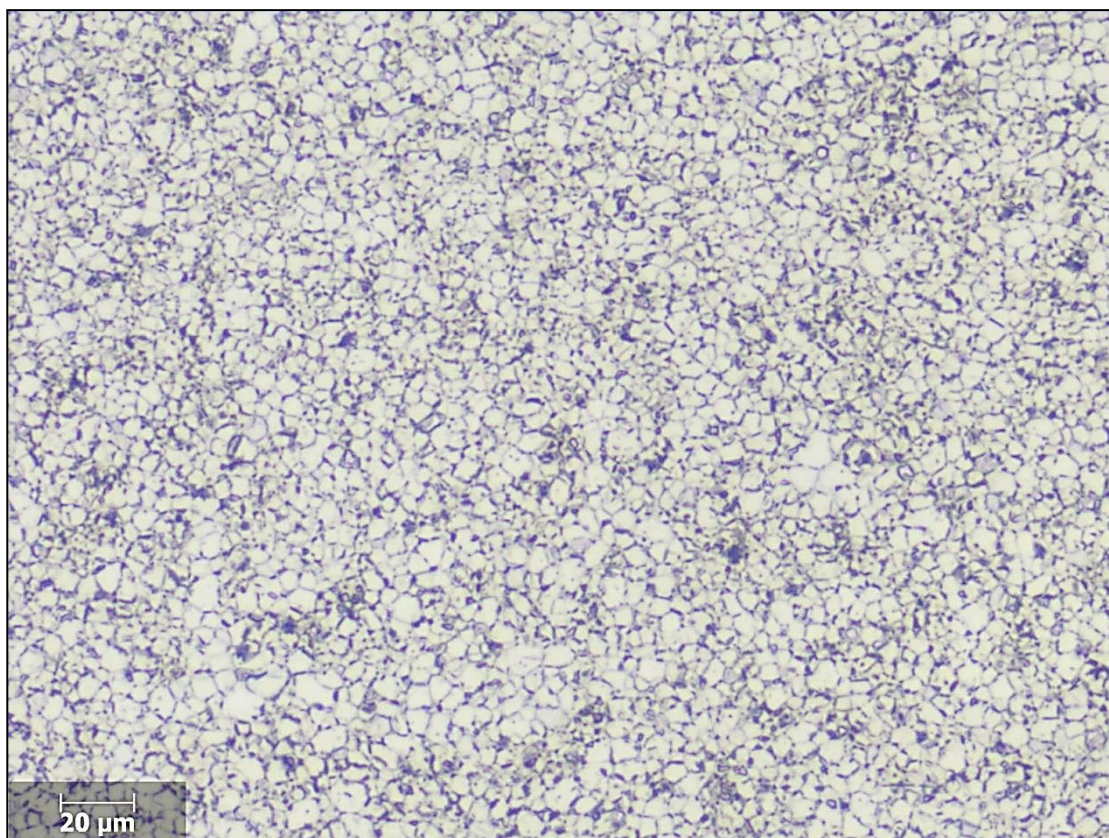


Figure 7: Sample 1 - thread area after fine-polishing and etching with etchant Kroll – 200 x.

QATM-Preparation method

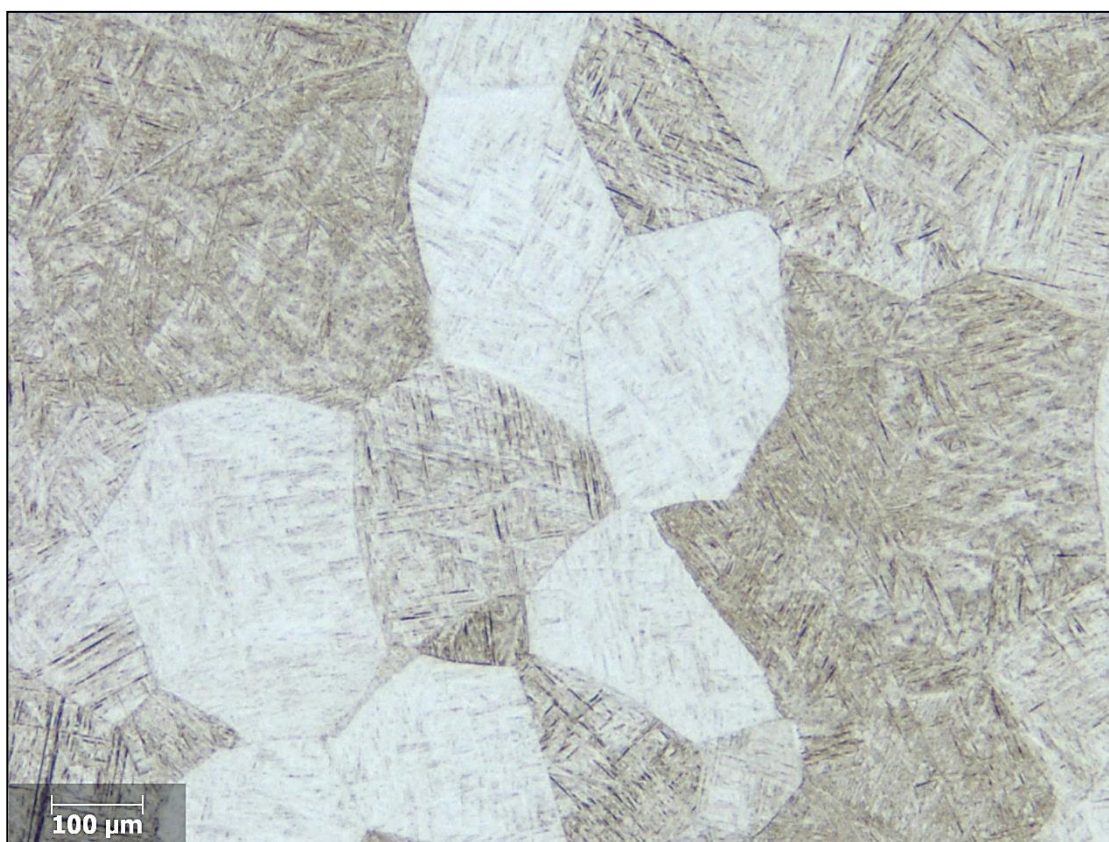


Figure 8: Sample 1 - screw head area after fine-polishing and etching with Kroll for 30 s – 50 x.

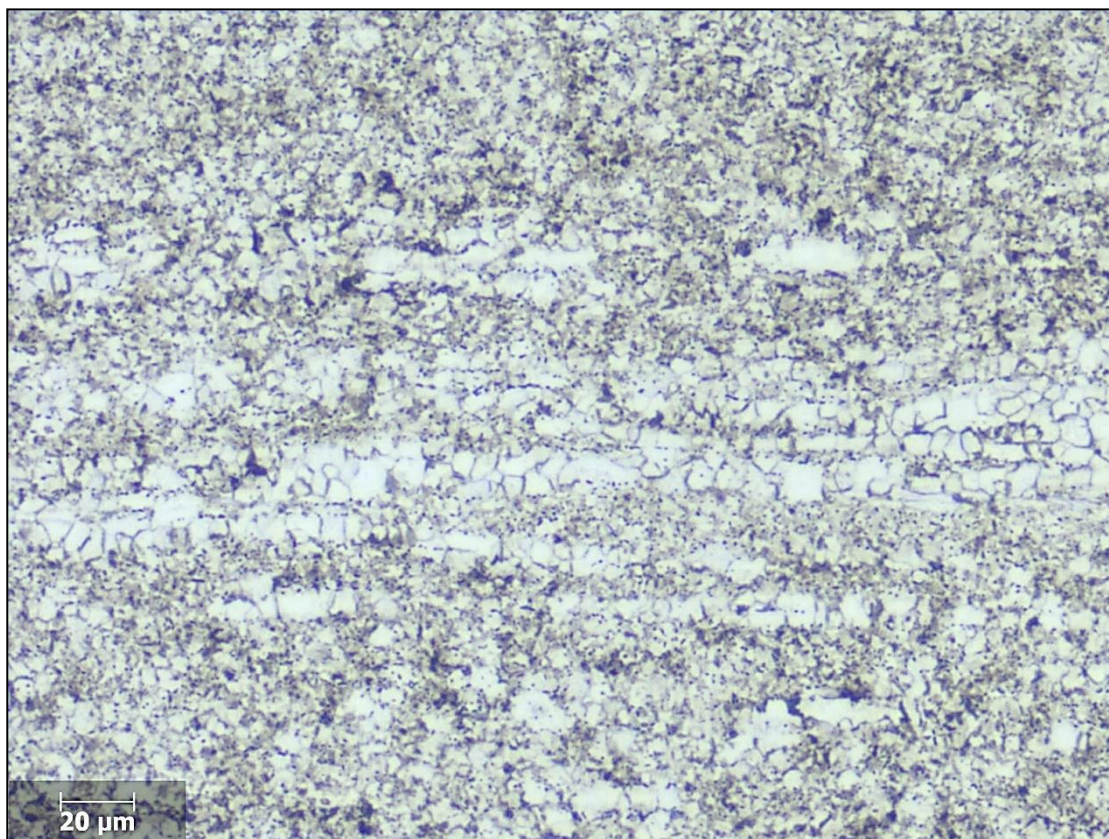


Figure 9: Sample 2 - thread area after fine-polishing and etching with etchant Kroll – 200 x.

QATM-Preparation method



Figure 10: Sample 2 - screw head area after fine-polishing and etching with Kroll for 30 s – 50 x.