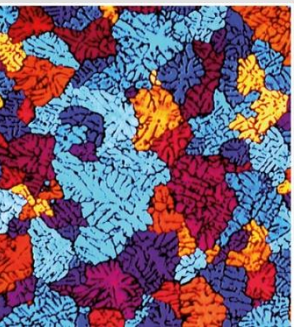


Metallographic preparation of the nitride layer



Objective:

The aim of this report is to study the nitride coatings on the steel sample. To prepare the nitride coating, the most important issue is to prepare it without damaging the coating. For example, during cutting, the cutting direction should be adjusted so that the matrix can support the coatings.

QATM-Preparation method

Sectioning

 CUTTING			
Equipment	Cut-off wheel	Anti-corrosion coolant	Clamping tool
Brillant 220	Al ₂ O ₃ cut-off wheel	QATM standard 95014280	1 x Easy clamping plate M Z2236008 1 x height adapter 30 Z2270006 1 x fast lock vice 50 Z2270000
Cutting method			
Automatic vertical cut			
Parameters			
Feed speed	Pulse parameter	Rotational speed	
0.1 mm/s	Without pulse	4000 U/min	
Notes			
- A metallic sample was used as a distance piece for the fixture.			

Hot mounting

 MOUNTING					
Equipment	Consumable	Heating time	Temperature	Pressure	Cooling time
Qpress 50-4	EPO-Max	6:00	190°C	225 bar	6:00
Filler or additional consumable	Heating power	Pressure mode	Cooling power		
Bakelit	100%	From the beginning	80%		
Notes					
- The plastic part of the sample was not mounted. - Instead of EPO-Max, EPO black can be used as well. - The diameter of the mounting mold was ø 40 mm.					

QATM-Preparation method

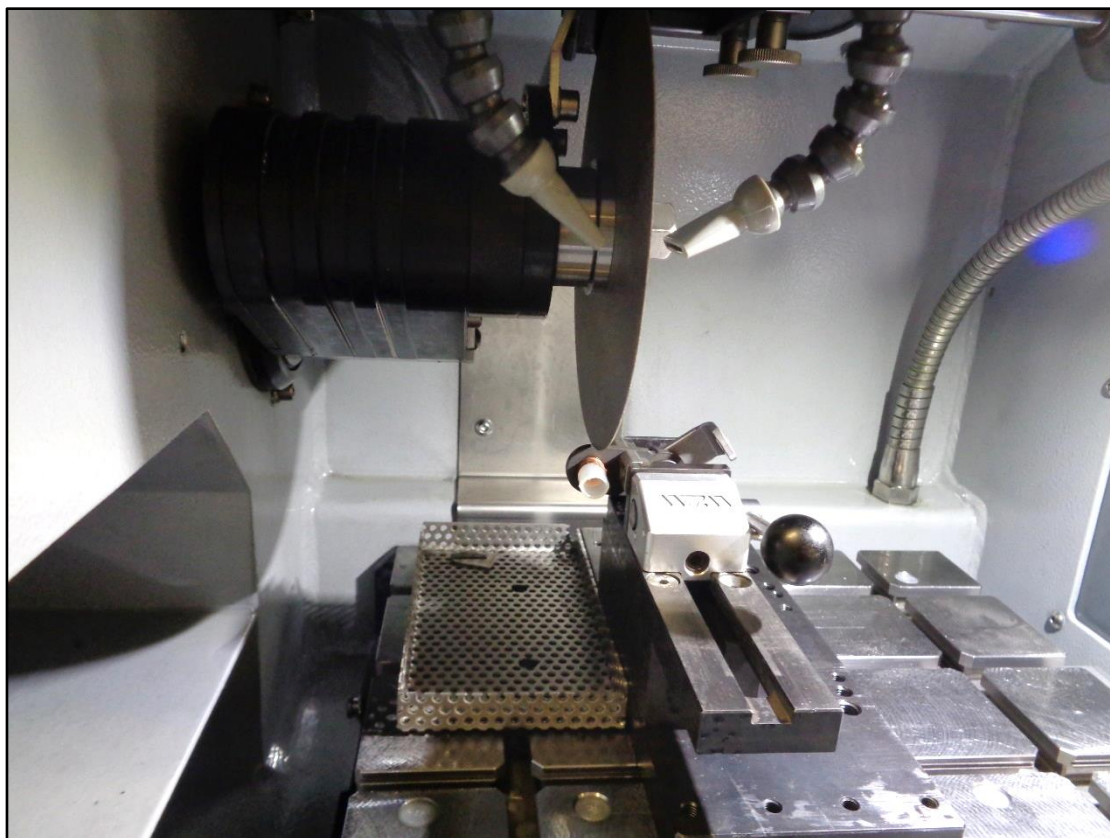


Figure 1. Overview of the cutting process and clamping in Brilliant 220

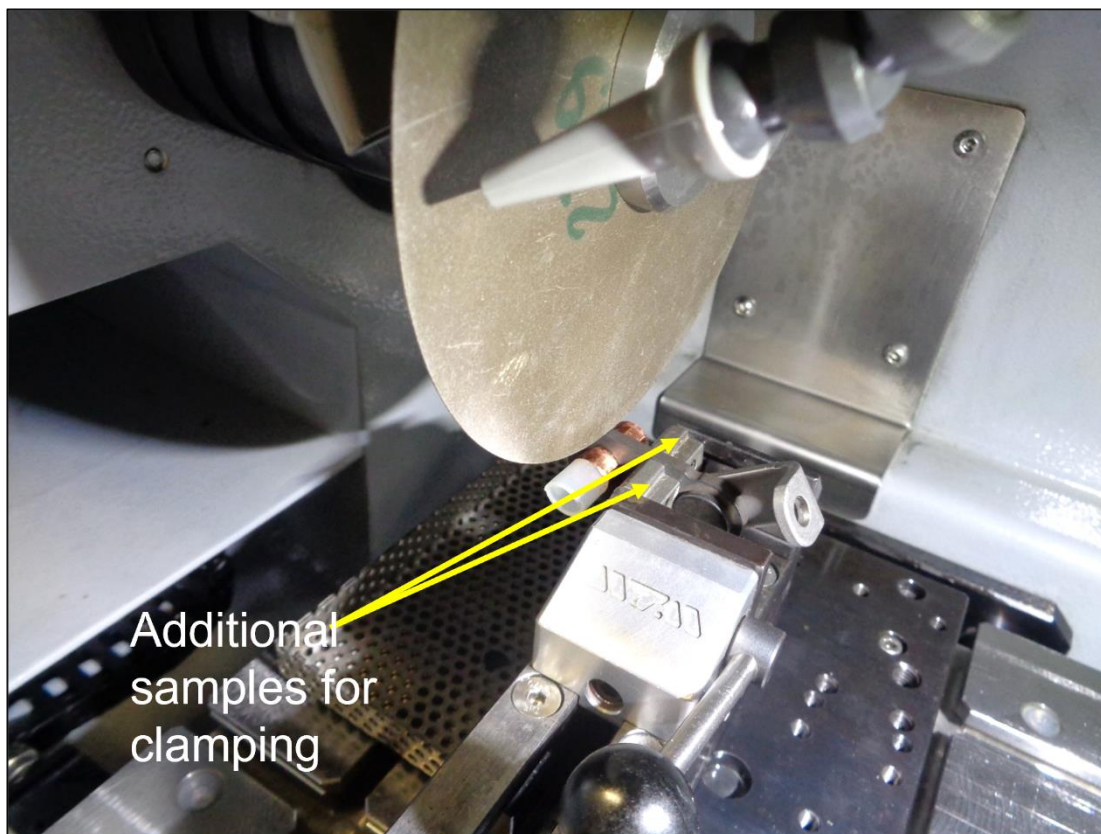


Figure 2. Clamping suggestion for the sample- with the additional samples as clamping help

QATM-Preparation method

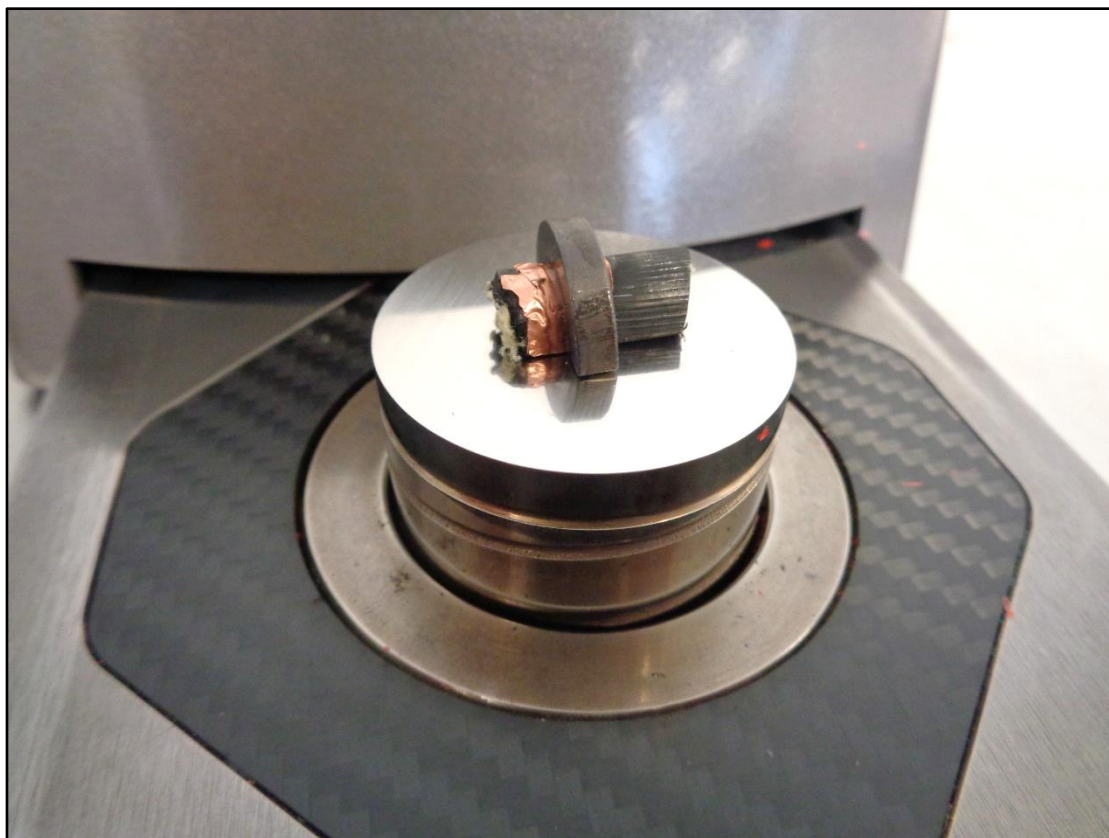


Figure 3: The cut samples ready for the hot mounting



Figure 4: The mounted samples with plastic part which is not Ok.

QATM-Preparation method

Grinding / Polishing

Equipment	Sample holder	Pressure mode				
SAPHIR 550	6 x ø 40 mm Z5400203	Single				
Step	MEDIUM		 RPM		 N	 min
 Planar grinding	SiC-Paper foiled back P240	H ₂ O	SH: 100 WP: 150	▶▶	25	1:30
 Planar grinding	SiC-Paper foiled back P320	H ₂ O	SH: 100 WP: 150	▶▶	25	1:30
 Grinding	SiC-Paper foiled back P600 (400)	H ₂ O	SH: 100 WP: 150	▶▶	25	1:30
 Grinding	SiC-Paper foiled back P1200 (600)	H ₂ O	SH: 100 WP: 150	▶▶	25	1:30
 Pre-polishing	ALPHA	Diamond sus. Poly, 9µm + water-based lubricant	SH: 100 WP: 150	◀▶	30	6:00
 Polishing	Gamma	Diamond sus. Poly, 3µm + water-based lubricant	SH: 100 WP: 150	▶▶	30	4:00
 Fine polishing *	OMEGA	Eposil F 0.1 µm	SH: 100 WP: 80	◀▶	20	1:30 (H ₂ O the last 0:10)

Notes

- SH = Rotational speed of samples holder
- WP = Rotational speed of working plate
- Pre-dosing time for 9 µm = 2 s
- Dosing interval and dosing time for 9 µm = every 30 s, each time 1.5 s
- Dosing interval and dosing time for alcohol base lubricant = every 90 s, each time 1.5 s
- Pre-dosing time for 3 µm = 2 s
- Dosing interval and dosing time for 3 µm = every 30 s, each time 1.5 s
- Dosing interval and dosing time for alcohol base lubricant = every 90 s, each time 1.5 s
- Pre-dosing time for 1 µm = 2 s
- Dosing interval and dosing time for 1 µm = every 30 s, each time 1.5 s
- Dosing interval and dosing time for alcohol base lubricant = every 90 s, each time 1.5 s

* The fine polishing step can be an optional step to remove the scratches from the matrix surface.

QATM-Preparation method



Figure 5: The coating layers after 3 µm polishing step– 100 x

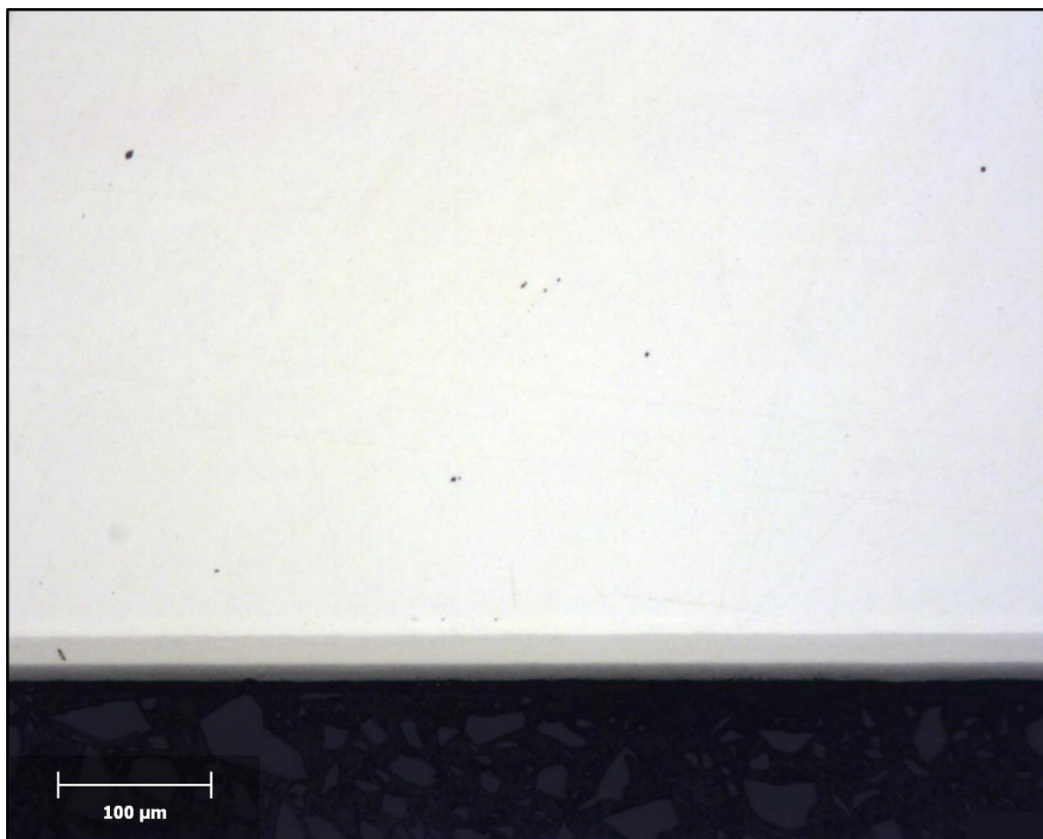


Figure 6: The other side of the sample's surface in figure 5 – 100 x

QATM-Preparation method

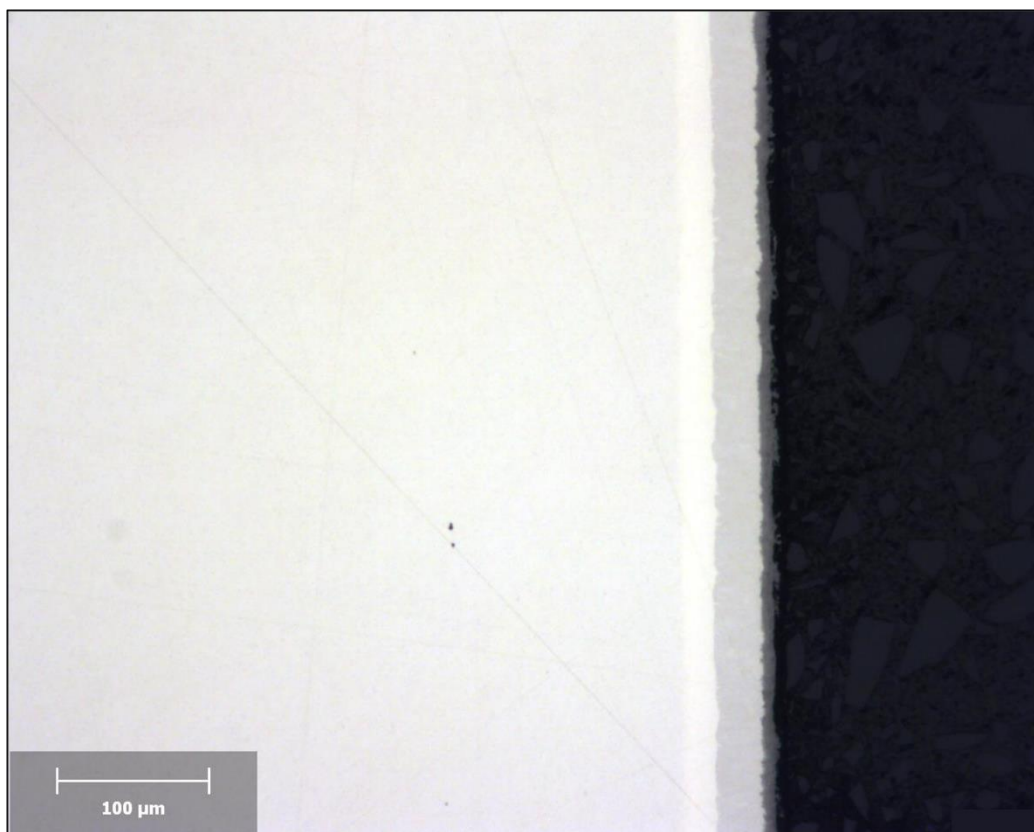


Figure 7: The coating layers after 3 μm polishing step – 100 x



Figure 8: The other side of the surface in figure 7– 100 x