

Application lab report

Preparation of ceramic coated aluminum



QATM-Preparation method

Objective:

This report shows a preparation method for a ceramic coated alumina sample (Figure 1). The sample was prepared on Qcut 200 A and Qpol 250 A1 Eco. For the grinding steps the grinding discs VEGA were used. Detailed parameters will follow in the report.

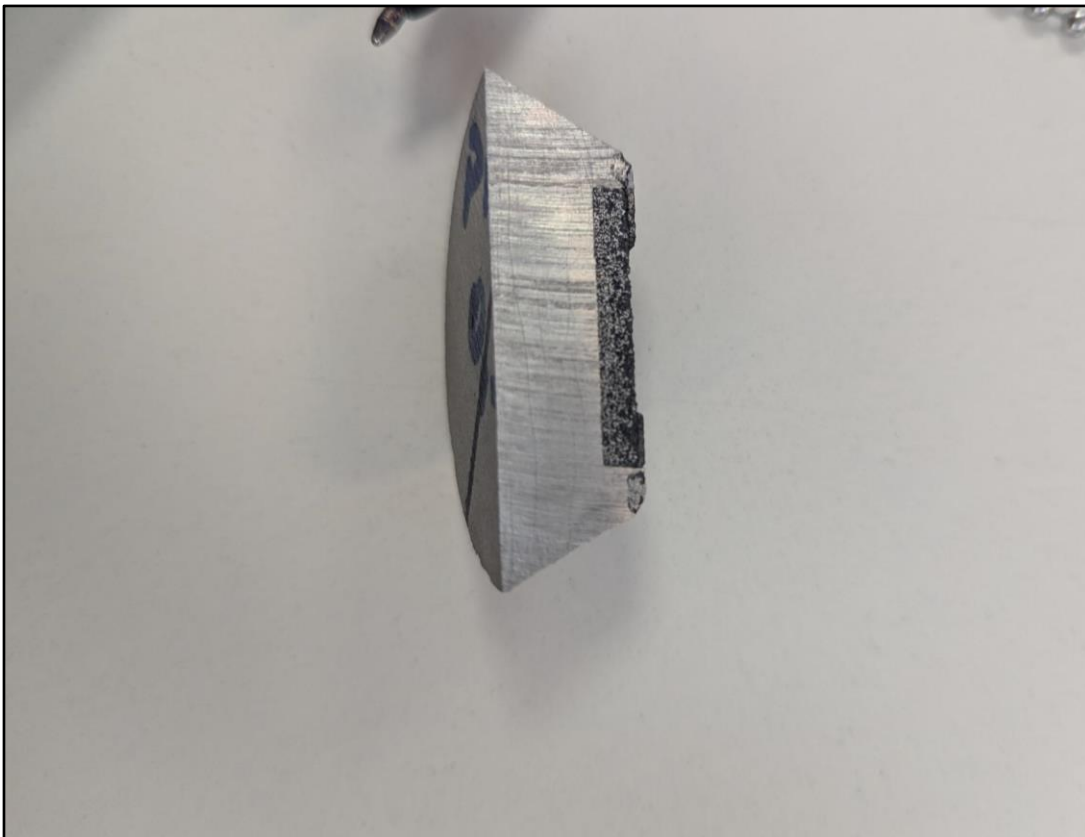


Figure 1: As-received samples.

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Cutting

 Cutting			
Device	Cut-off disc	Anti-corrosion coolant	Clamping tool
Qcut 200 A	SiC-cut-off disc 92004998	ATM CoolCut, 95004146	- Qtool 40 Z2270200 - Easy Clamping Plate S Z2236030
Cutting method			
Automatic vertical cutting method (with Y-Axis)			
Parameters			
Feed speed	Pulse parameter	Cut-off disc rotational speed	
0,2 mm/s	Without pulse	3500 RPM	
Notes			

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Cold mounting

 Mounting				
Consumable	Mixing ratio Volume	Curing time	Mold	Additional equip.
KEM 20	Powder : Liquide 2 : 1	15 Minutes	PP or PE, ø 40 mm	- Mixing cup - Mixing spoon - Mixing stick - Pressure unit 95016569
Notes				
- the curing process should be carried out in the pressure unit 95016569				

Cold mounting

 Mounting				
Consumable	Mixing ratio Weight	Curing time	Mold	Additional equip.
Qpox 92	Resin : Hardener 20 g : 4,6 g	8 h	PP, ø 40 mm	- Mixing cup - Scale - Mixing stick - Infiltration unit M6500001
Notes				
- the mounting process with Qpox 92 should be done with vacuum. For that use Infiltration unit				

UV mounting

 Mounting				
Device	Consumable	Curing time	Mold	Additional equip.
QMOUNT	Qprep UV 55	8 - 10 Minutes	PP, ø 40 mm	-
Notes				

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Figure 2: Overview of the samples after mounting.

Left: mounting with **Qprep UV 55**

Middle: mounting with **KEM 20**

Right: mounting with **Qpox 92**

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Grinding/Polishing

Device	Samples holder	Pressure mode					
Qpol 250 A1 Eco	Z5445025	Single					
Step	MEDIUM		 RPM		 N	 min	
 Planar grinding	VEGA 54 µm	H ₂ O	200	100 ◀ ▶	20	1:00	
 Grinding	VEGA 25 µm	H ₂ O	200	100 ◀ ▶	20	1:30	
 Pre-Polishing	CONTERO S	Diamond susp. Wb. Poly, 9 µm + alc. Lubricant	150	100 ▶ ▶	30	4:00	
 Polishing	GAMMA	Diamond susp. Wb. Poly, 3 µm + alc. Lubricant	150	120 ▶ ▶	30	7:00	
 Fine polishing	OMEGA	Eposil F 0,1 µm	100	90 ◀ ▶	20	2:00 – 4:00 (Rinsing time: 10 s)	

Notes

- Pre-dosing for 9 µm: 10 s
Dosing interval and dosing duration for Dia. Suspension 9 µm:
Every 15 s for 1,5 s
- Pre-dosing for 3 µm: 3 s
Dosing interval and dosing duration for Dia. Suspension 3 µm:
Every 30 s for 1,5 s
- Dosing interval and dosing duration for lubricant:
Every 60 s for 1,5 s
- Pre-dosing for 0,1 µm: 3 s
Dosing interval and Dosing duration for fine polishing suspension:
Every 20 s for 1,0 s

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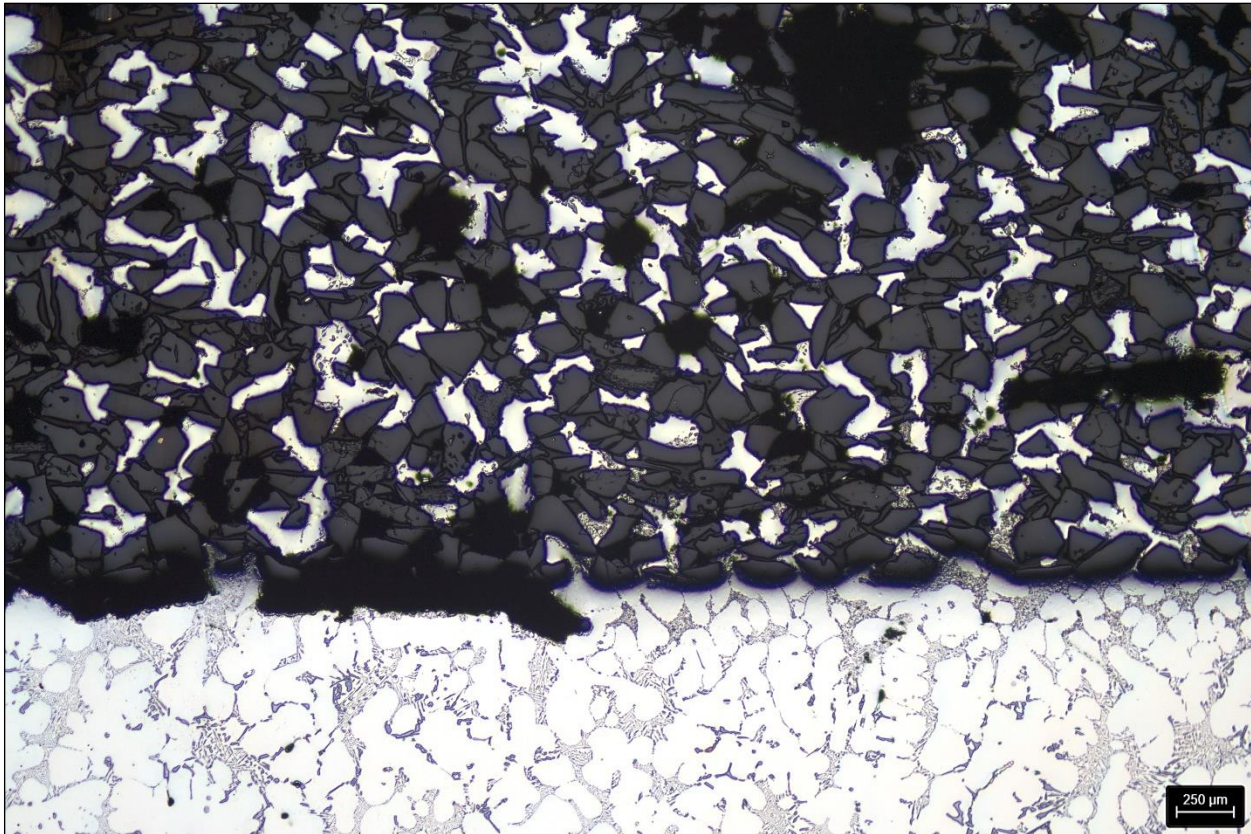


Figure 3: Edge area after mounting with Qprep UV 55 – 25 x

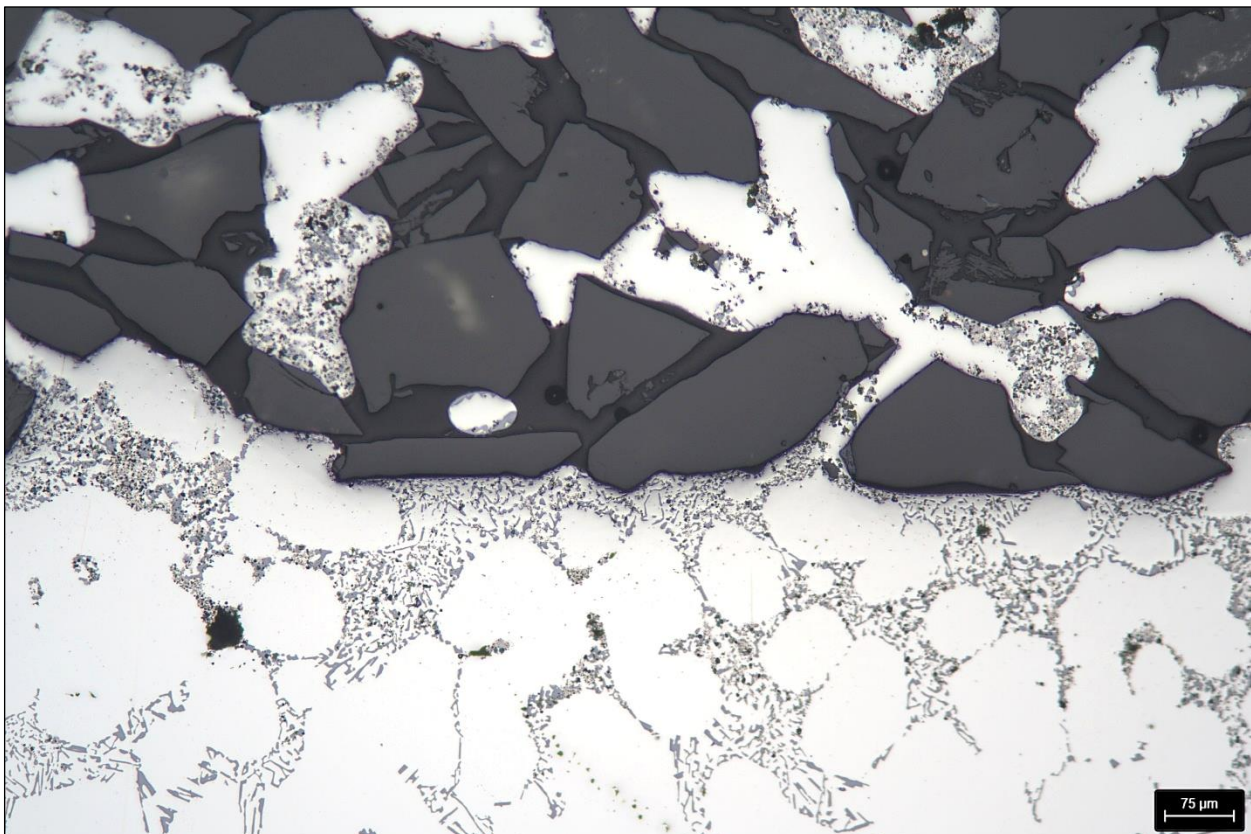


Figure 4: Edge area after mounting with Qprep UV 55 – 100 x

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Figure 5: Edge area after mounting with KEM 20 – 25 x

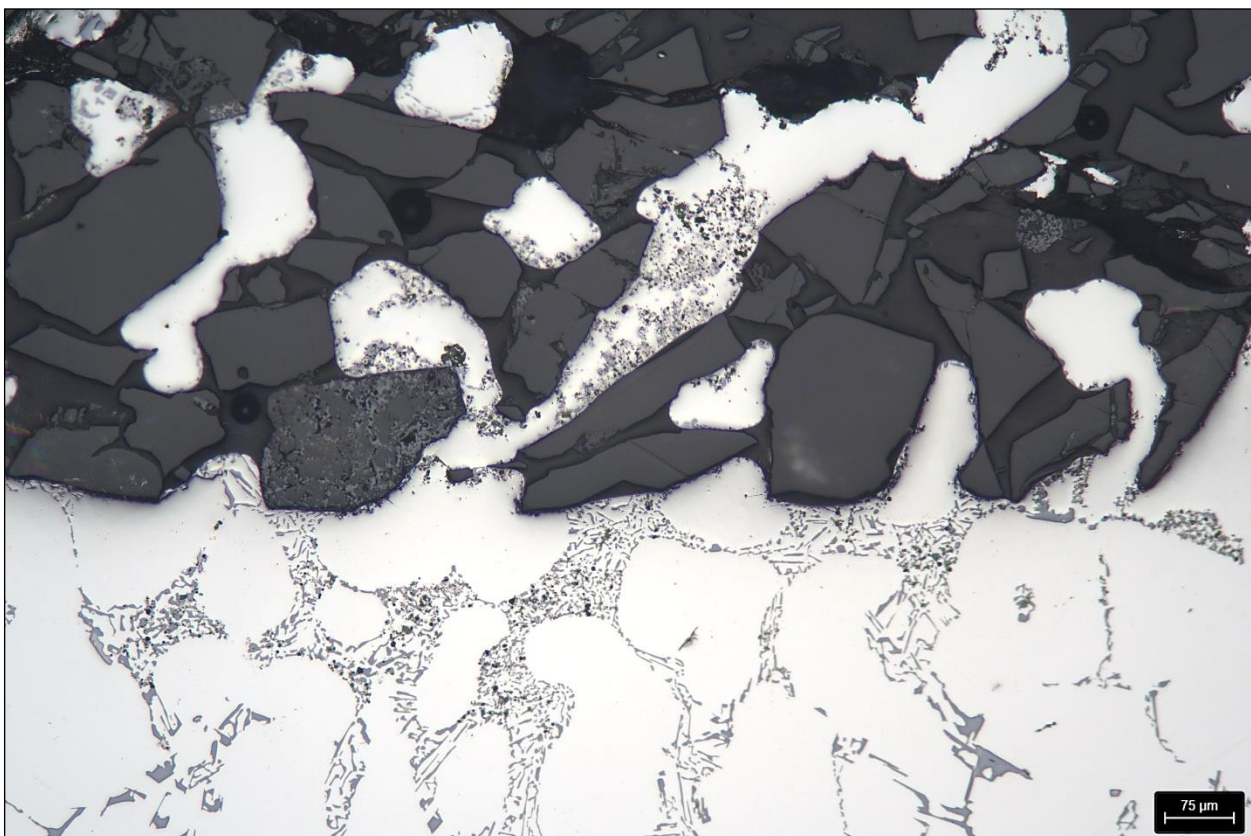


Figure 6: Edge area after mounting with KEM 20 – 100 x

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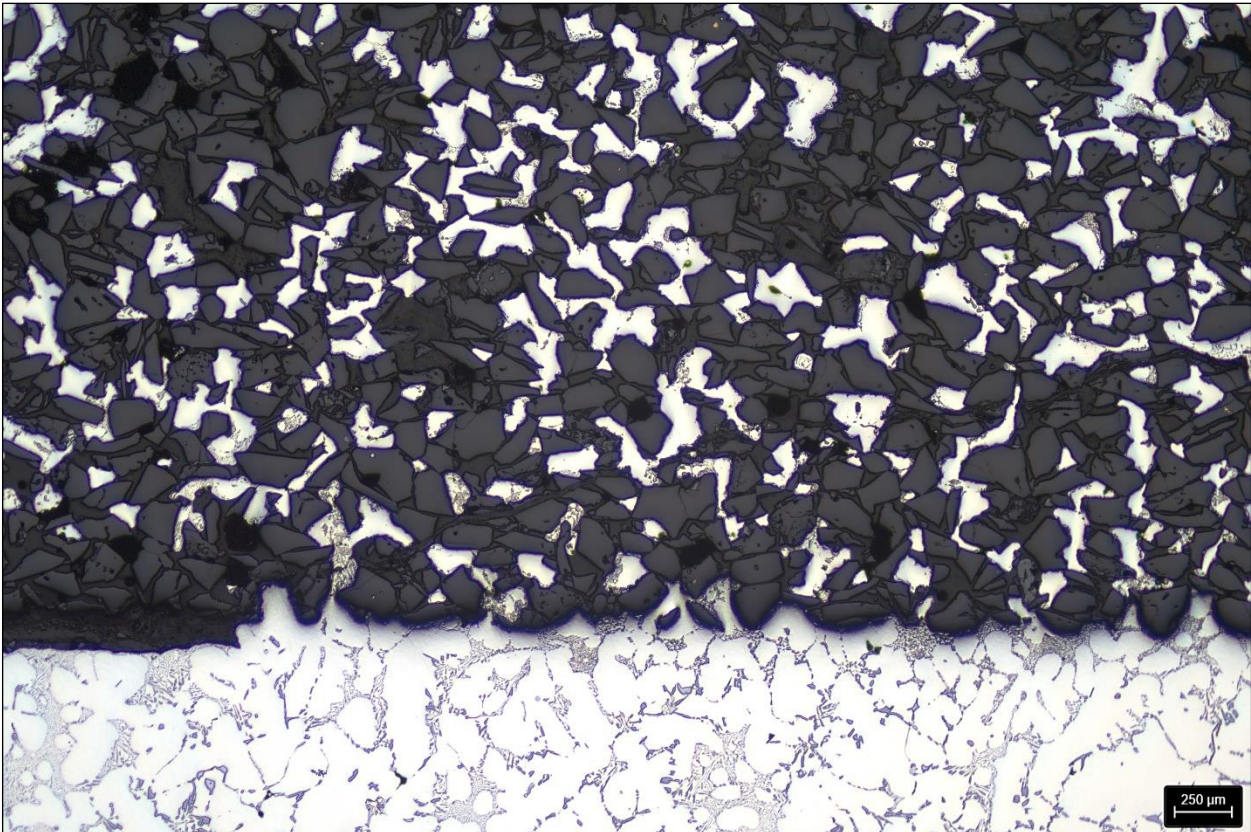


Figure 7: Edge area after mounting with Qpox 92 – 25 x

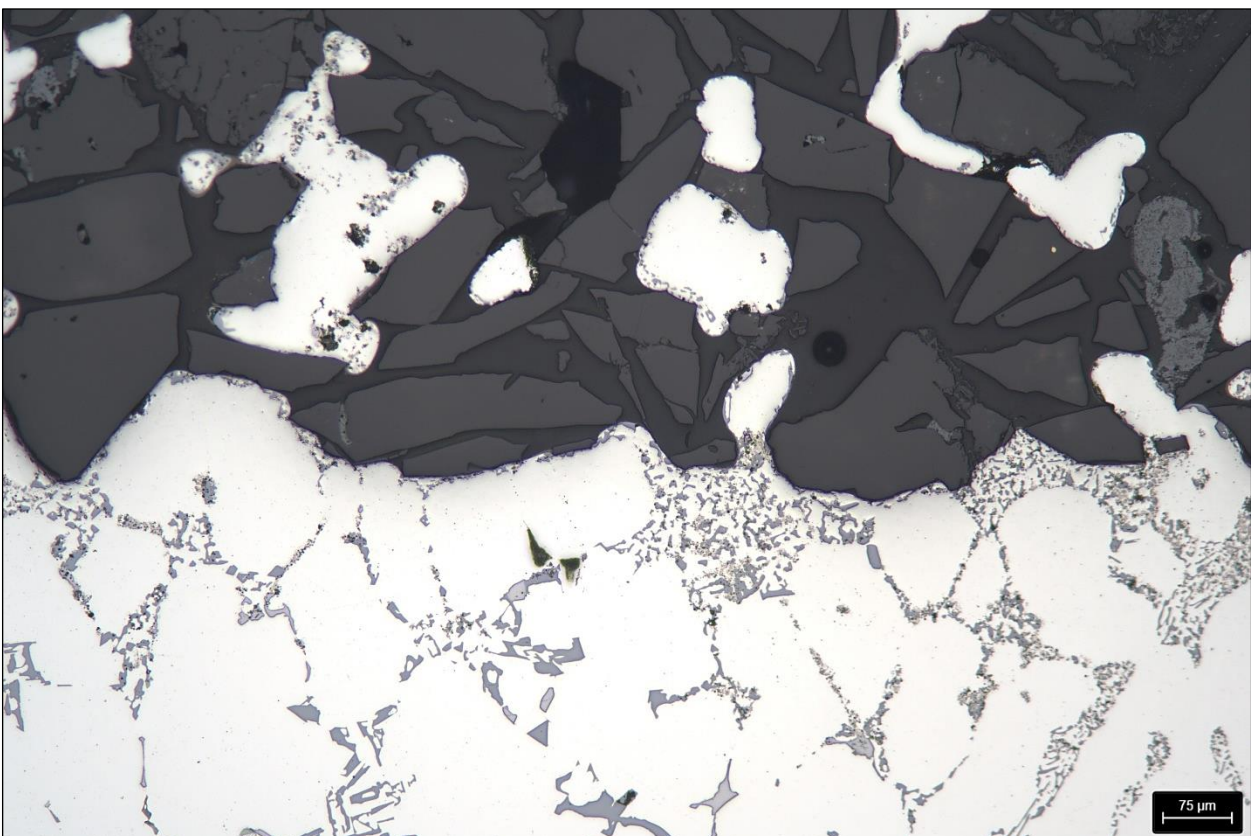


Figure 8: Edge area after mounting with Qpox 92 – 100 x

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Conclusion:

The cutting process can be done very well with the cutting machine Qcut 200 A and the SiC-Cut-off- disc with order no.: 92004998. The recommended feed speed of 0,2 mm/s is to cut the aluminum. If it is needed to cut through the coating – the feed speed need to be reduced.

Due to the porosity in the edge area (coating) - the mounting resin Qpox 92 and the Infiltration unit shows the best results.

The diamond grinding discs VEGA 54 µm and VEGA 25 µm are suitable as a grinding consumable for this material.