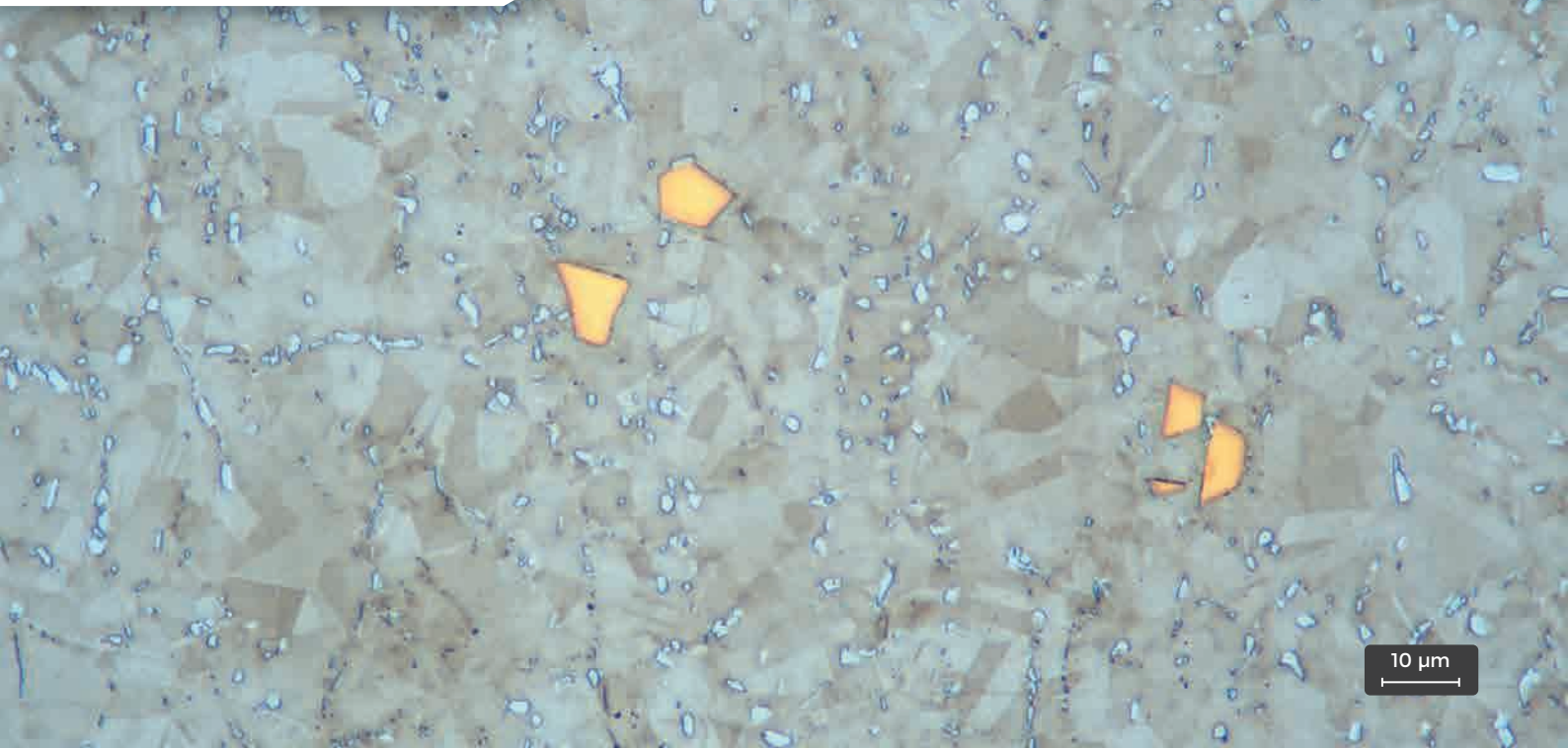




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METALLOGRAPHIC PREPARATION OF AN INCONEL 718 ALLOY

Objective:

Inconel 718 is a high-temperature-resistant alloy and is strengthened by the γ'' -phase. In addition to the formation of various carbides, the δ -phase may also form under certain conditions. The formation of needle-like δ -phase both at the grain boundaries and within the grains is particularly critical, as this negatively affects the material properties. Often, excessively long holding time during heat treatment is the cause of these precipitates. The sample should be examined for homogeneous distribution of the structure. The samples were cut (Qcut 200 A), hot mounted (Qpress 50) and prepared (Qpol 300 AI Eco+). Detailed parameters and images can be found in the following application laboratory report.

CUTTING



Precision cut-off machine
Qcut 200 A

Device	Qcut 200 A	
Cut-off wheel	Aluminum oxide, rubber-bonded	Item no.: 92002770
Coolant and anti-corrosion agent	ATM-CoolCut	Item no.: 95004146
Clamping tool	- Qtool 40	Item no.: Z2270200
	- Easy clamping plate S	Item no.: Z2236030
Cutting method	Horizontal cut (X-axis)	
Parameter	- Feeding speed	0.08 mm/s
	- Pulse setting	Without pulse
	- Rotational speed of cut-off wheel	2500 rpm

Notes

Cutting the sample



HOT MOUNTING



Hot mounting press Qpress 50

Device	Qpress 50
Mounting material	EPO BLACK
Heating time	4:30 min
Temperature	180 °C
Pressure	250 bar
Cooling time	3:30 min
Accessories	-
Heat set up	100%
Pressure mode	Pressure when temperature has been reached
Cooling set up	100%
Mould Assembly	Ø 50 mm
Notes	



Sample in the hot mounting press



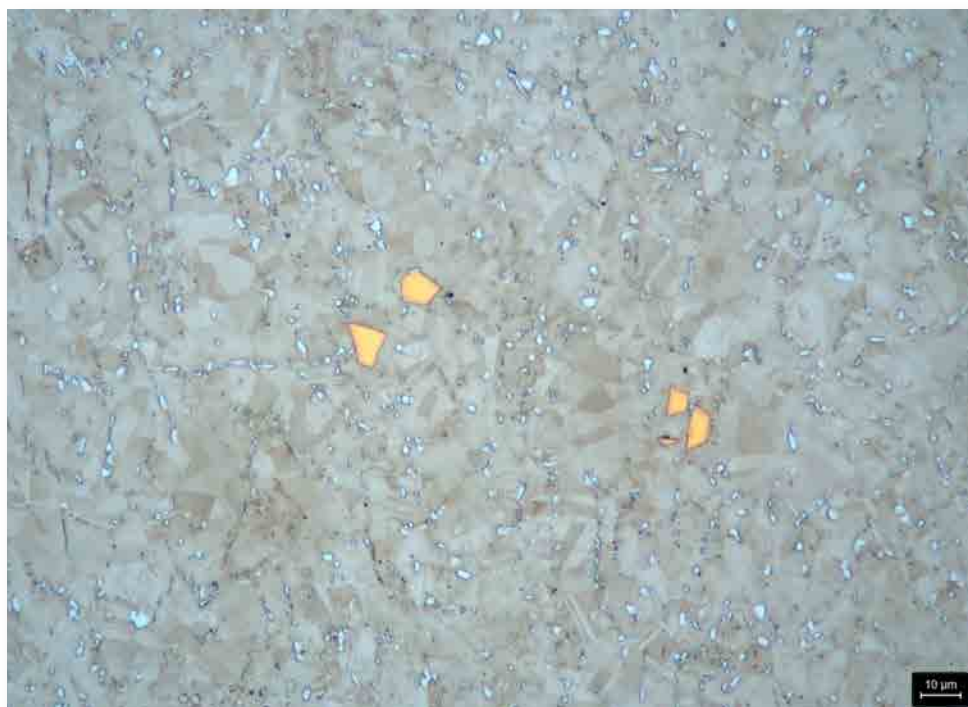
Automatic grinding and polishing machine Qpol 300 A1 Eco+

GRINDING/POLISHING

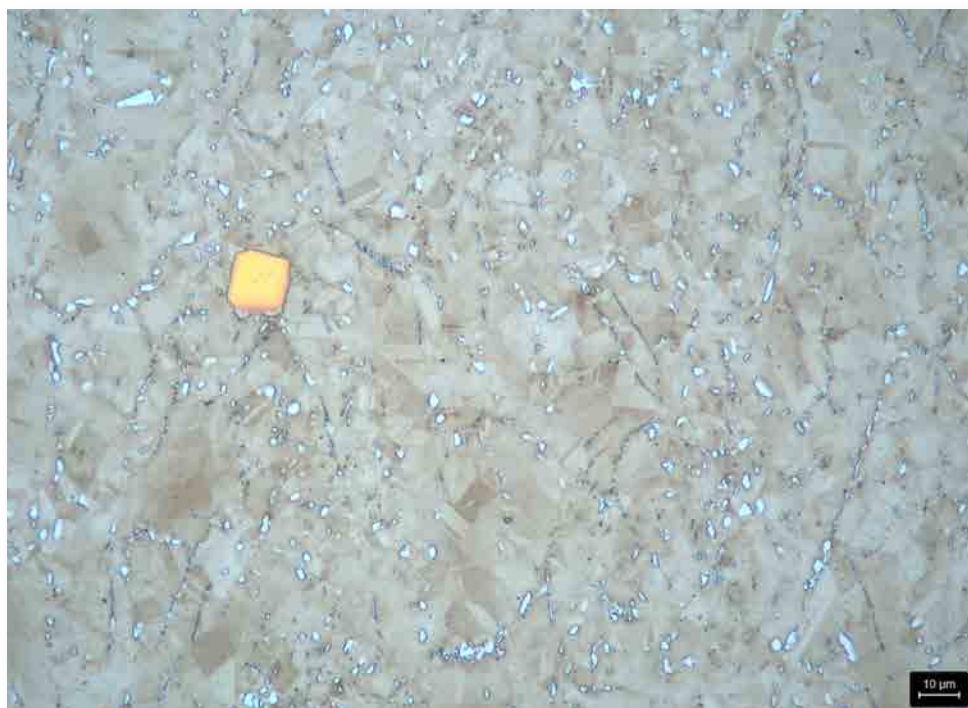
Device	Qpol 300 A1 Eco+	
Sample holder	6 x Ø 50 mm	Item no.: Z5446026
Pressure	Single pressure	

STEP	MEDIUM		 rpm	 rpm	 Single pressure N	 min
 Pre-grinding	GALAXY Green	H ₂ O	300	120 ►► Synchronous Rotation	30	2:00
 Pre-polishing	BETA	Diamond suspension Wb. Poly, 9 µm + alc. Lubricant	130	100 ►► Synchronous Rotation	30	6:00
 Polishing	GAMMA	Diamond suspension Wb. Poly, 3 µm + alc. Lubricant	130	100 ►► Synchronous Rotation	30	5:00
 Fine polishing	OMEGA	Eposil F 0.1 µm	100	90 ◄◄ Counter Rotation	25	1:30 (Rinsing time : 20 s)
 Etching (chem.)	Etchant V2A					3:00
Notes	- Pre-dosing for 9 µm, 3µm and final polishing: 3 s - Dosing interval and dosing time for diamond suspension 9 µm and 3 µm: Each 30 s for 1.3 s - Dosing interval and dosing time for lubricant: Each 60 s for 1.3 s - Dosing interval and dosing time for final polishing suspension: Each 20 s for 1.3 s - The microscopic images were taken with a Leica DM8000 optical microscope					

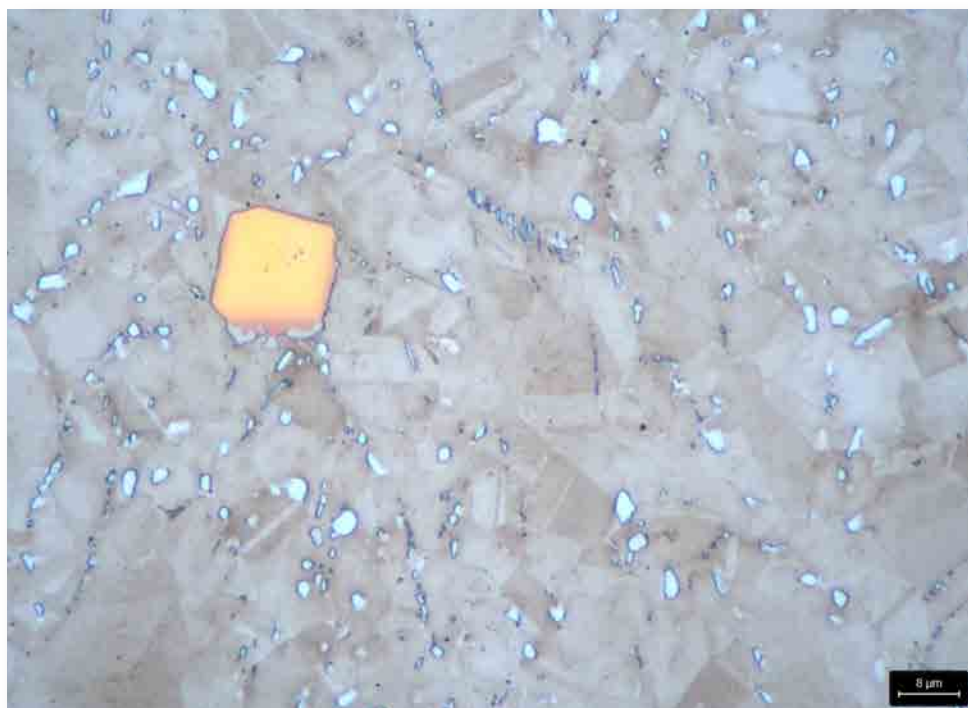
The microstructure of the Inconel 718 alloy under an optical microscope.
The image shows orange titanium carbonitride particles - 500:1.



The microstructure of the Inconel 718 alloy
under an optical microscope.
The image shows an orange titanium
carbonitride particle - 500:1.



The microstructure of the Inconel 718 alloy
at high magnification under an optical
microscope - 1000:1.



Find out more at
www.qatm.com