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METALLOGRAPHIC PREPARATION OF COPPER LASER WELD SEAM

Objective:

The welded copper hairpins obtained (mounted, $\varnothing$ 30 mm) should be ground down to the center in order to subsequently examine the weld seam.



CUTTING

Device	Qcut 200 A	
Cut-off disc	Al ₂ O ₃ -Cutting Disc	Item no.: 92002769
Anti-corrosion coolant	ATM-CoolCut	Item no.: 95004146
Clamping tool	- QTOOL 40 S	Item no.: Z2270201
	- Easy clamping plate S	Item no.: Z2236030
Cutting method	Automatic horizontal cut (X-Axis)	
Parameter	- Feed speed	0.1 mm/s
	- Pulse parameter	Without pulse
	- Cut-off disc rotational speed	3.000 rpm



Precision cut-off machine
Qcut 200 A

The sample clamped in the clamping tool



The sample after cutting





Cold mounting material KEM 20

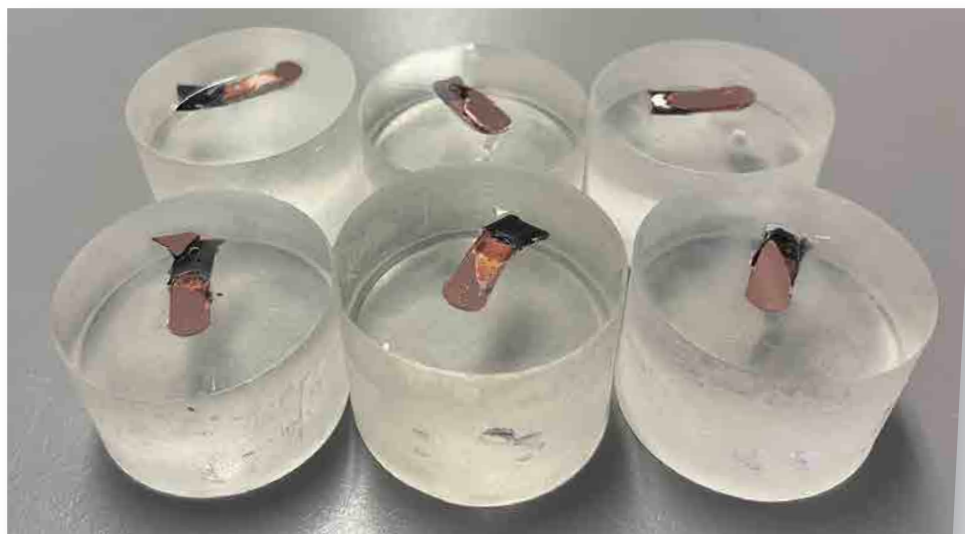
COLD MOUNTING

Mounting Material	KEM 20
Mixing ratio	2 : 1 (Powder : Liquid)
Curing time	15 min
Mounting mould	PP mould, Ø 40 mm
Accessories	- Mixing cup - Wooden stick - Pressure device
Notes	- For the transparent sample here, we need a pressure device

The sample in the cold mounting mold



The mounted samples





Automatic grinding and polishing robot
Qpol 250 BOT

GRINDING/POLISHING

Device	Qpol 250 BOT	
Sample holder	6 x Ø 30 mm	Item no.: Z5803084
Pressure	Central	

STEP	MEDIUM		 rpm	 rpm	 Central pressure N	 min
 Grinding	SiC-Paper foil back, P320	H ₂ O	200	120 ◀ ▶	160	3:00
Cleaning Water: 15 s, Ethanol: 15 s, Compressed air: 15 s, SH: 50 rpm						
 Pre-Polishing	BETA	Dia. Suspension Poly 9 µm + alc. Lubricant	150	120 ▶ ▶	160	6:00
Cleaning Water: 15 s, Ethanol: 15 s, Compressed air: 15 s, SH: 50 rpm						
Ultrasonic bath Duration: 1:30, Rotational speed of the sample holder: 50 rpm						
Cleaning Water: -- s, Ethanol: 15 s, Compressed air: 15 s, SH: 50 rpm						
 Polishing	SIGMA	Dia. Suspension Poly 3 µm + alc. Lubricant	150	120 ▶ ▶	150	5:00
Cleaning Water: 15 s, Ethanol: 15 s, Compressed air: 15 s, SH: 50 rpm						
 Polishing	ZETA	Dia. suspension Poly 1 µm + alc. Lubricant	150	120 ▶ ▶	60	1:00 - 2:00
Cleaning Water: 15 s, Ethanol: 15 s, Compressed air: 15 s, SH: 50 rpm						
 Fine Polishing	Omega	Eposil F 0,1 µm	100	80 ▶ ▶	120	7:00
Cleaning Water: 30 s, Ethanol: 15 s, Compressed air: 15 s, SH: 50 rpm						
Ultrasonic bath Duration: 1:00, Rotational speed of the sample holder: 50 rpm						
Cleaning Water: -- s, Ethanol: 15 s, Compressed air: 15 s, SH: 50 rpm						
 Etching (chem.)	Klemm II					1:30

Notes

- Pre-dosing for 9 µm, 3 µm und 1 µm: 3 s
- Dosing interval and dosing duration for Dia. Suspension 9 µm, 3 µm, 1 µm: Every 30 s for 1.3 s
- Pre-dosing for Lubricant: 3 s
- Dosing interval and dosing duration for lubricant: Every 60 s for 1.3 s
- Dosing interval and Dosing duration for fine polishing suspension: Every 15 s for 1.3 s
- * The H₂O₂ solution can be used with Eposil F with the mixing ratio of 10:1 to receive better results.

Sample alignment in the sample holder



The weld seam after etching with Klemm II - 25 x



The weld seam after etching with Klemm II - 100 x



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