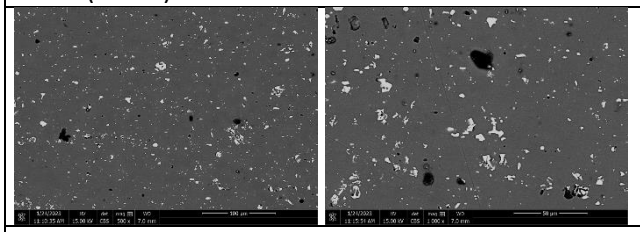
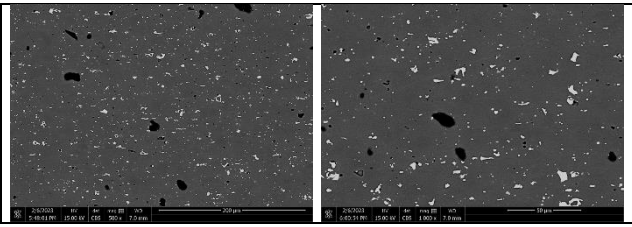
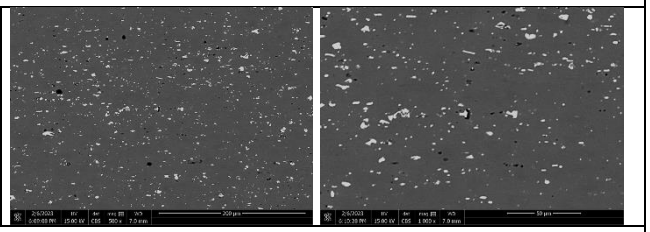
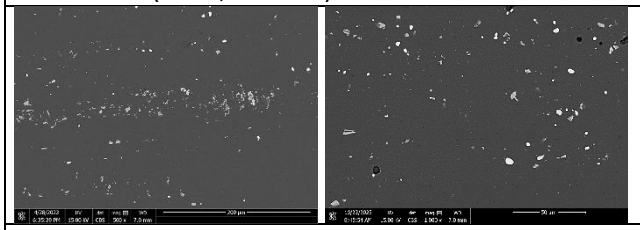
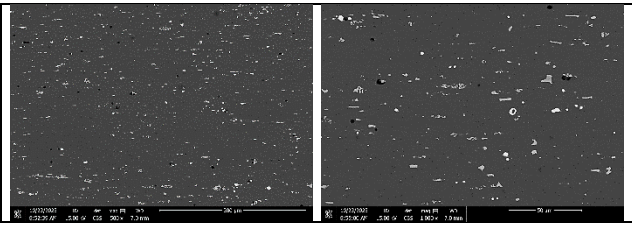
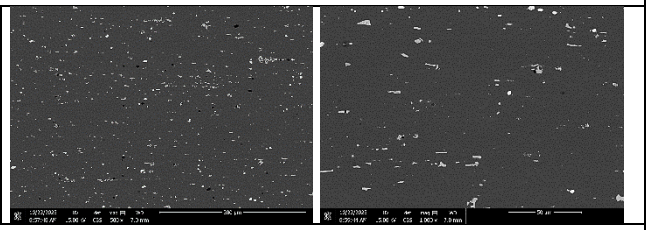
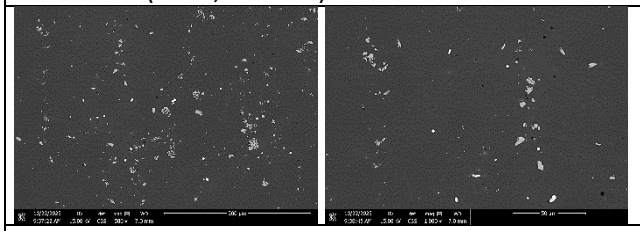
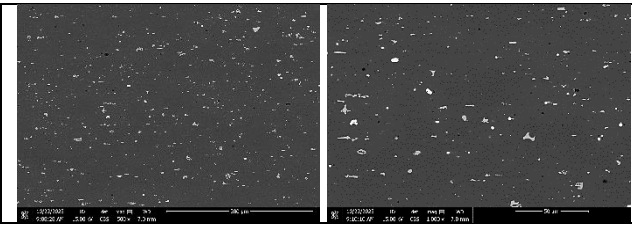
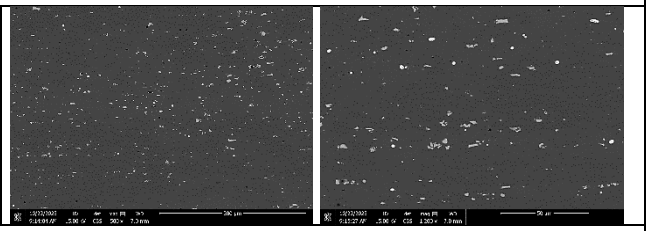
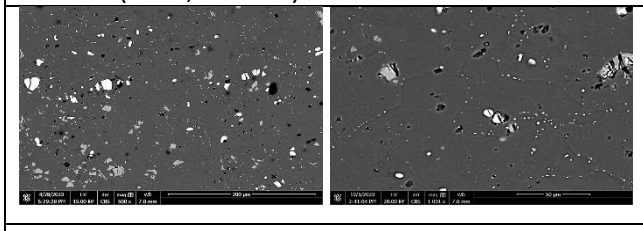
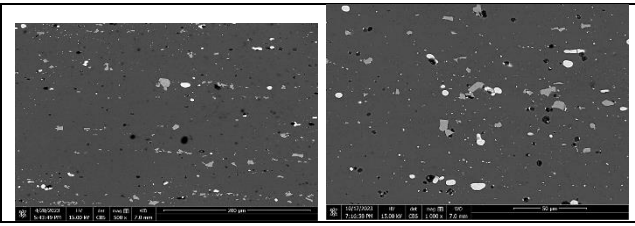
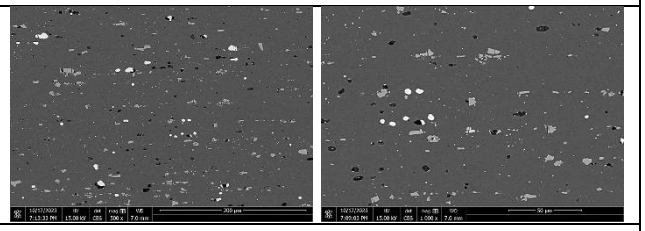
Supplementary Materials

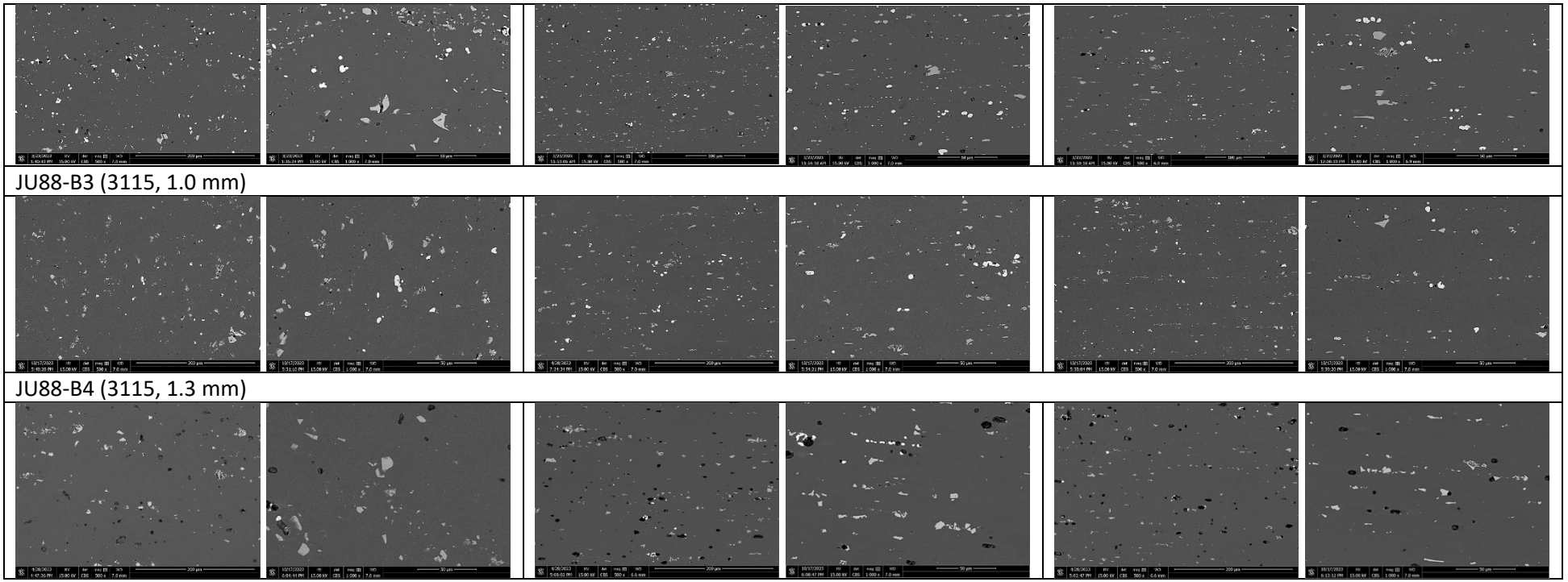
SI 1. Sampling group chosen for the study.

Sample name	Aircraft	Date of production	Country	Shaping	Thickness (mm)
2017	/	/	Modern	Rolled	1.0
2024	/	/	Modern	Rolled	1.0
BR37	Breguet 765	1958	France	Rolled	1.0
MS-12	Morane-Saulnier 733 « Alcyon »	1951	France	Rolled	1.2
D217-1	Dornier Do 217	1943	Germany	Rolled	1.8
D217-2	Dornier Do 217	1943	Germany	Rolled	0.8
P47-1p	Republic P-47 « Thunderbolt »	1943	United States	Rolled	1.1
P47-2p	Republic P-47 « Thunderbolt »	1943	United States	Rolled	1.0
P47-3p	Republic P-47 « Thunderbolt »	1943	United States	Rolled	1.0
2024_T3511	/	/	Modern	Extruded	3.0
D338-1	Dewoitine D.338	1937-1939	France	Extruded	2.5
D217-22	Dornier Do 217	/	Germany	Extruded	3.5
P47-12	Republic P-47 « Thunderbolt »	/	United States	Extruded	2.7
D24-1	Dornier Do 24	/	Germany	Rolled	0.4
D24-2	Dornier Do 24	/	Germany	Rolled	1.1
B17-1	Boeing B-17 « Flying Fortress »	/	United States	Rolled	0.8
ES-1	SNCASO SO.6025 « Espadon »	1949	France	Rolled	1.9
ES-2	SNCASO SO.6025 « Espadon »	1949	France	Rolled	1.4
FW190-A1	Focke-Wulf Fw 190	/	Germany	Rolled	1.2
FW190-A2	Focke-Wulf Fw 190	/	Germany	Rolled	1.4
FW190-A3	Focke-Wulf Fw 190	/	Germany	Rolled	1.9
FW190-B1	Focke-Wulf Fw 190	/	Germany	Rolled	0.7
FW190-C1	Focke-Wulf Fw 190	/	Germany	Rolled	2.6
JU88-A1	Junkers Ju 88	1942	Germany	Rolled	1.0

JU88-A2	Junkers Ju 88	1942	Germany	Rolled	1.9
JU88-A3	Junkers Ju 88	1942	Germany	Rolled	1.4
JU88-B1	Junkers Ju 88	1940	Germany	Rolled	1.0
JU88-B2	Junkers Ju 88	1940	Germany	Rolled	1.2
JU88-B3	Junkers Ju 88	1940	Germany	Rolled	1.0
JU88-B4	Junkers Ju 88	1940	Germany	Rolled	1.3
MEL-1	Messerschmitt Bf 109	1944	Germany	Rolled	1.2
D520-2	Dewoitine D.520	1940	France	Rolled	1.0
L298-2	Latécoère L.298	1940	France	Rolled	1.6
H111-2	Heinkel He 111	1937	Germany	Extruded	3.0
D338-3	Dewoitine D.338	1937-1939	France	Rolled	0.5
H177-1	Heinkel He 177	1943	Germany	Rolled	1.1

SI 2.a. German and modern Duralumin alloys – SEM microstructure observation (by backscattered electrons) – Magnification x500 and x1000

Rolling plane RP	Transverse plane TP	Normal plan NP
2017 (1 mm)		
		
FW190-A3 (3115, 1.9 mm)		
		
FW190-B1 (3115, 0.7 mm)		
		
JU88-A3(3115, 1.4 mm)		
		
JU88-B2 (3115, 1.2 mm)		



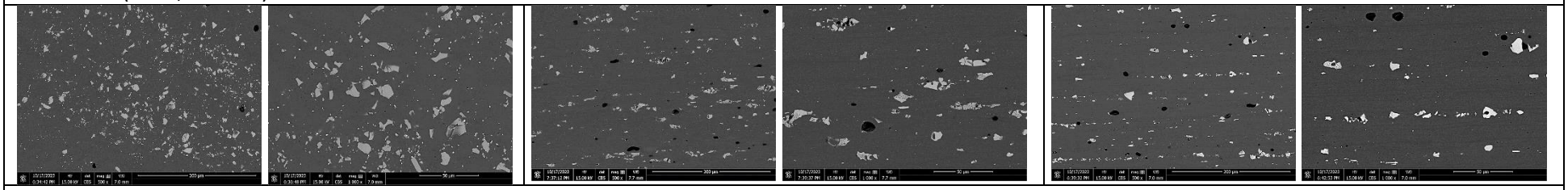
JU88-B3 (3115, 1.0 mm)

JU88-B4 (3115, 1.3 mm)

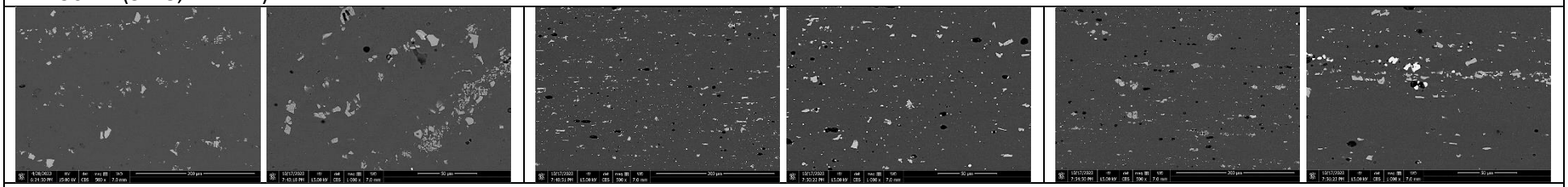
SI 2.b. German and modern Super-Duralumin alloys – SEM microstructure observation (by backscattered electrons) – Magnification x500 and x1000

Rolling plane RP	Transverse plane TP	Normal plan NP
2024 (1 mm)		

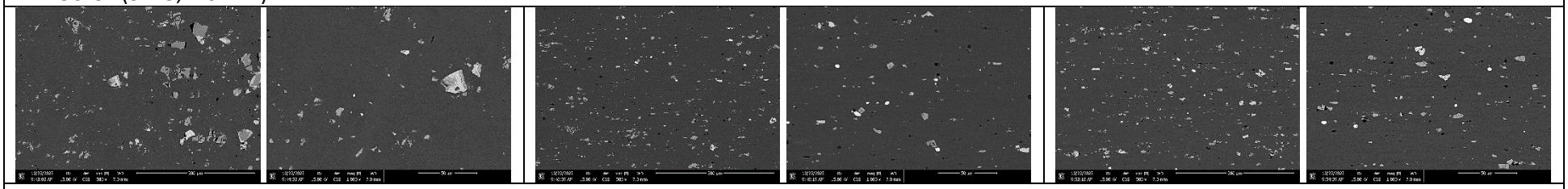
FW190-A1 (3125, 1.2 mm)



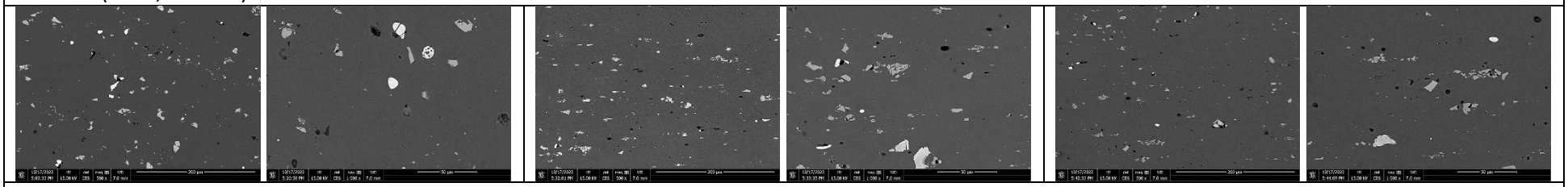
FW190-A2 (3125, 1.4 mm)



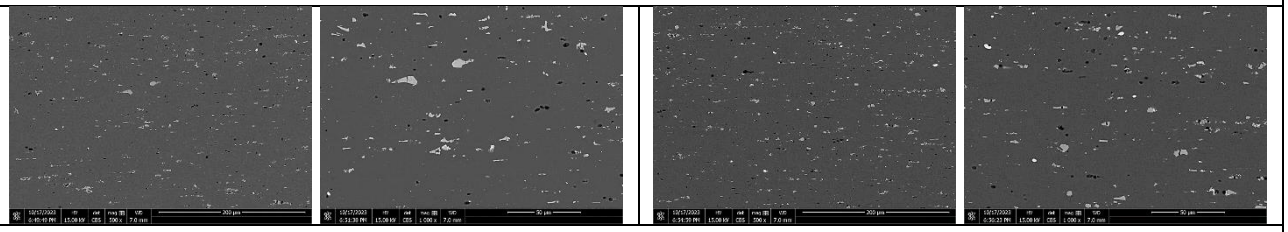
FW190-C1 (3125, 2.6 mm)



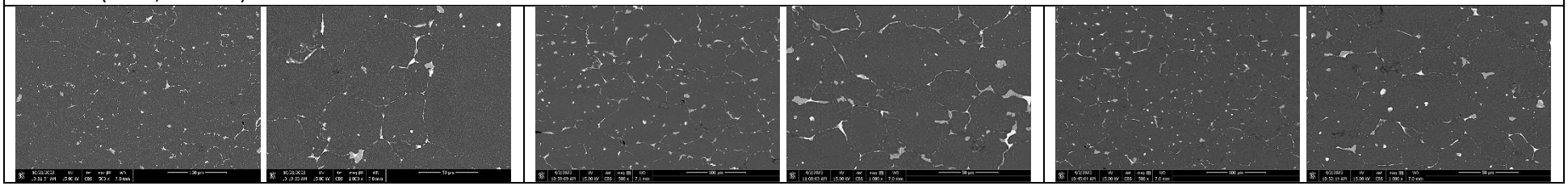
JU88-A1 (3125, 1.0 mm)



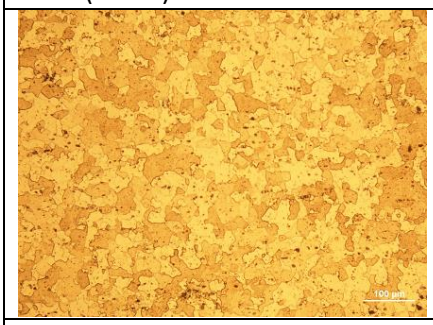
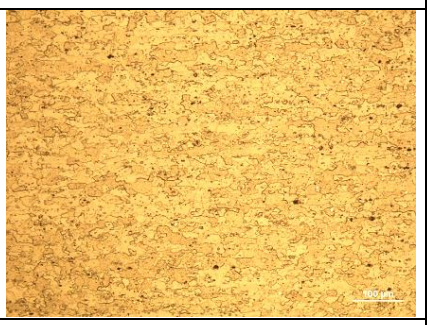
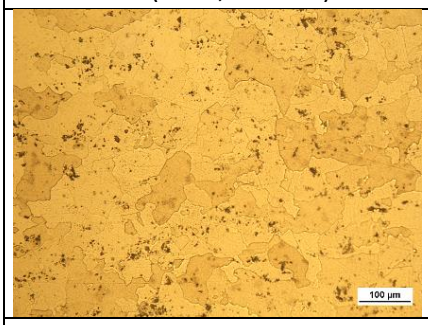
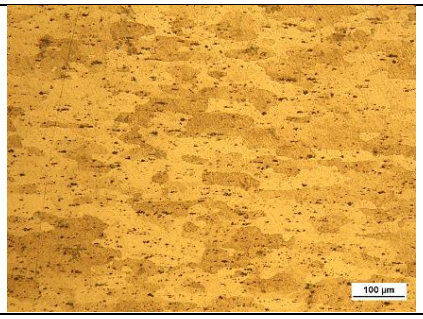
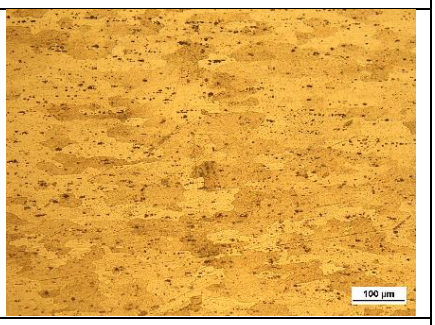
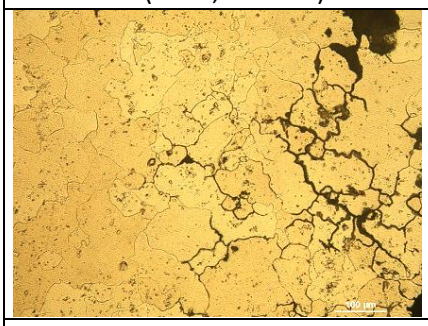
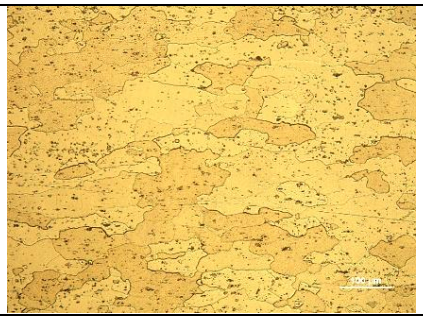
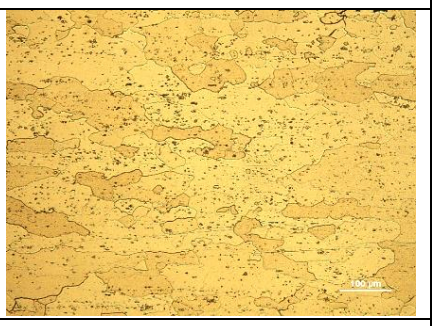
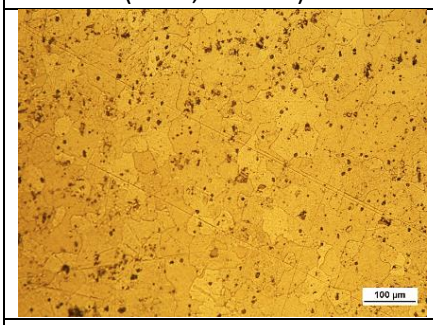
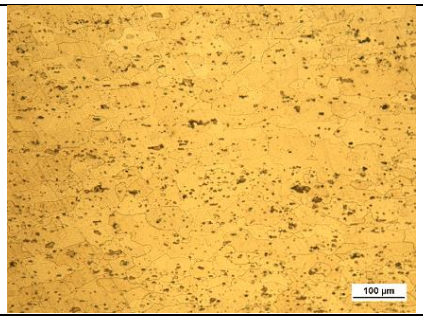
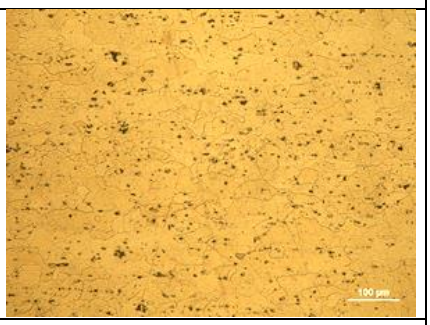
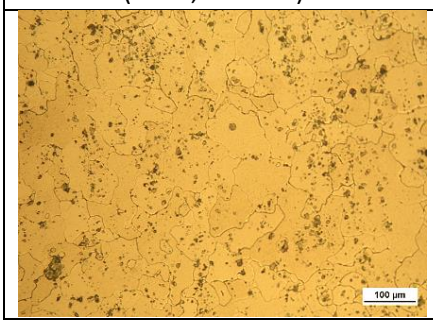
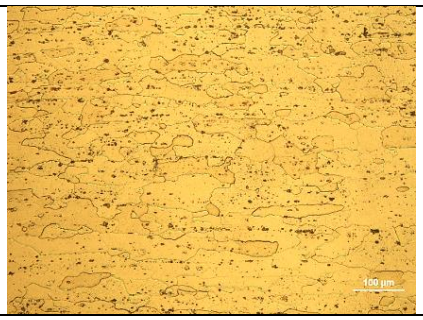
JU88-A2 (3125, 1.9 mm)

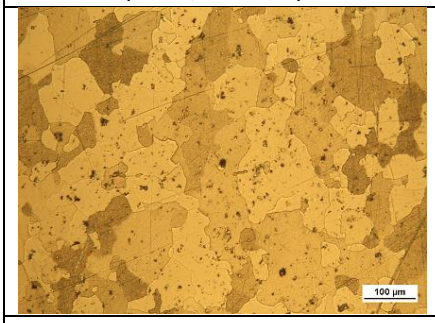
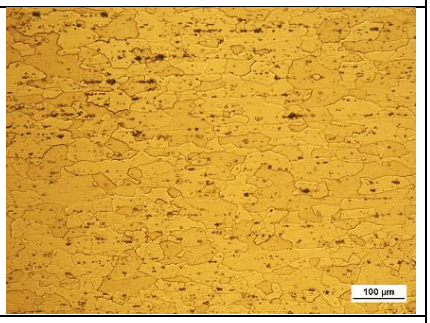
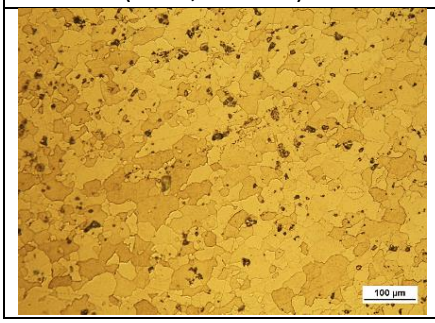


JU88-B1 (3125, 1.0 mm)

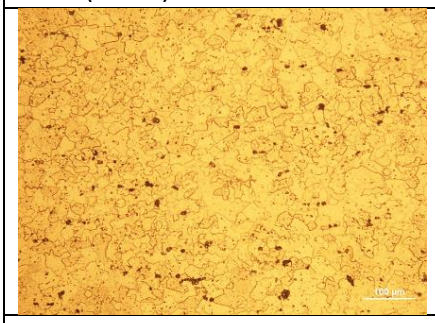
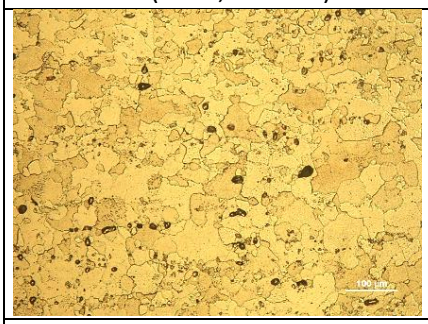
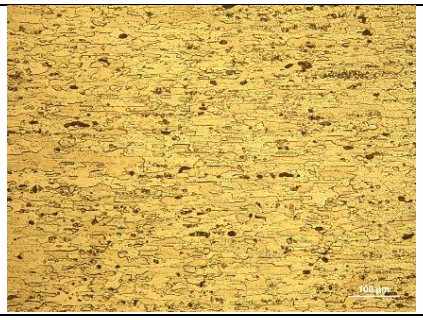
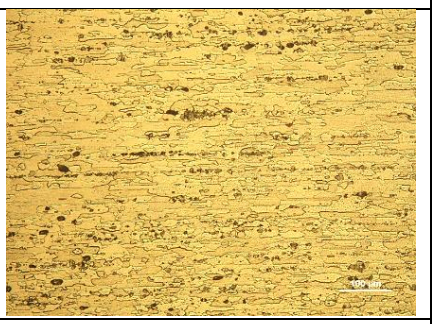


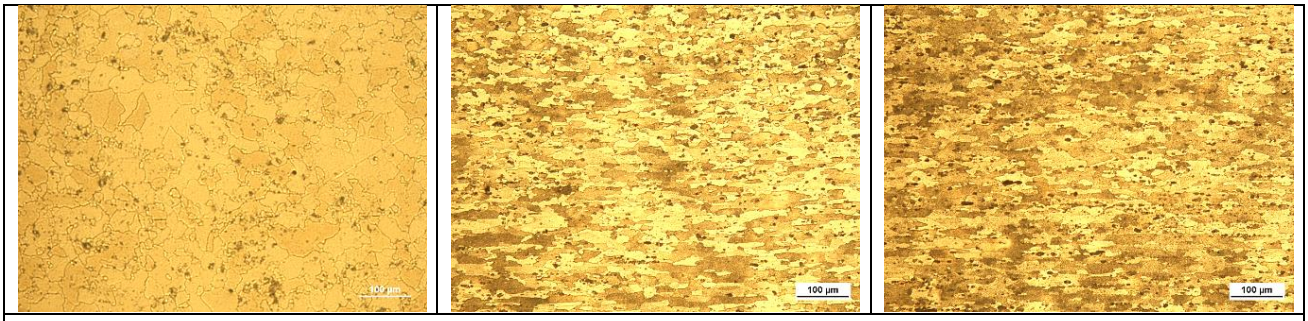
SI 3.a. German and modern Duralumin alloys – MO microstructure observation

Rolling plane RP	Transverse plane TP	Normal plan NP
2017 (1 mm)		
		
FW190-A3 (3115, 1.9 mm)		
		
FW190-B1 (3115, 0.7 mm)		
		
JU88-A3 (3115, 1.4 mm)		
		
JU88-B2 (3115, 1.2 mm)		
		

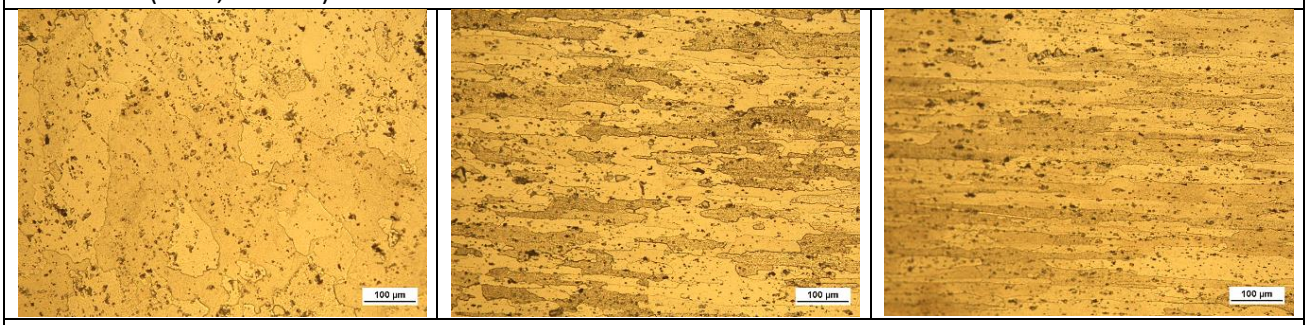
JU88-B3 (3115, 1.0 mm)		
		
JU88-B4 (3115, 1.3 mm)		
		

SI 3.b. German and modern Super Duralumin alloys – MO microstructure observation

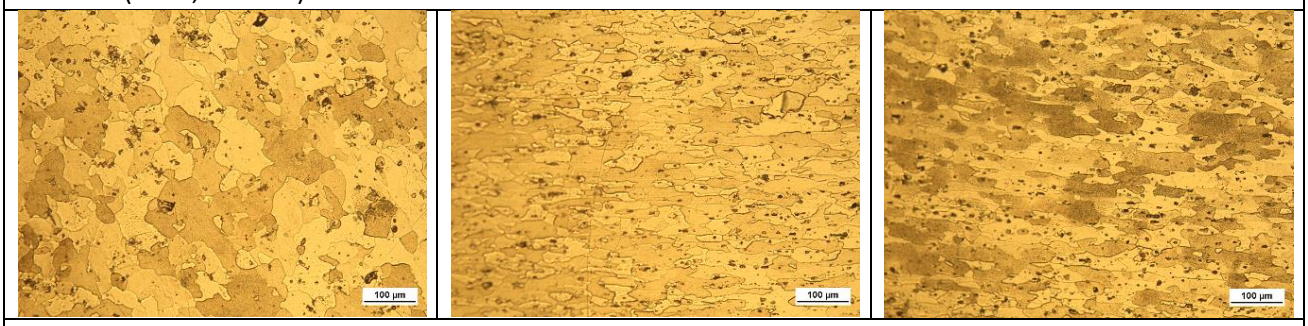
Rolling plane RP	Transverse plane TP	Normal plan NP
2024 (1 mm)		
		
FW190-A1 (3125, 1.2 mm)		
		
FW190-A2 (3125, 1.4 mm)		



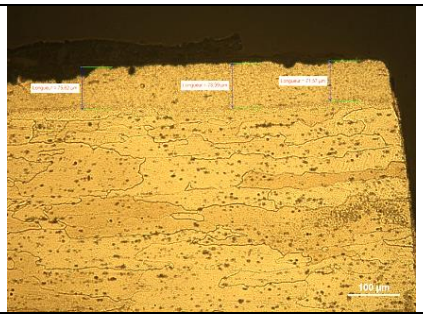
FW190-C1 (3125, 2.6 mm)



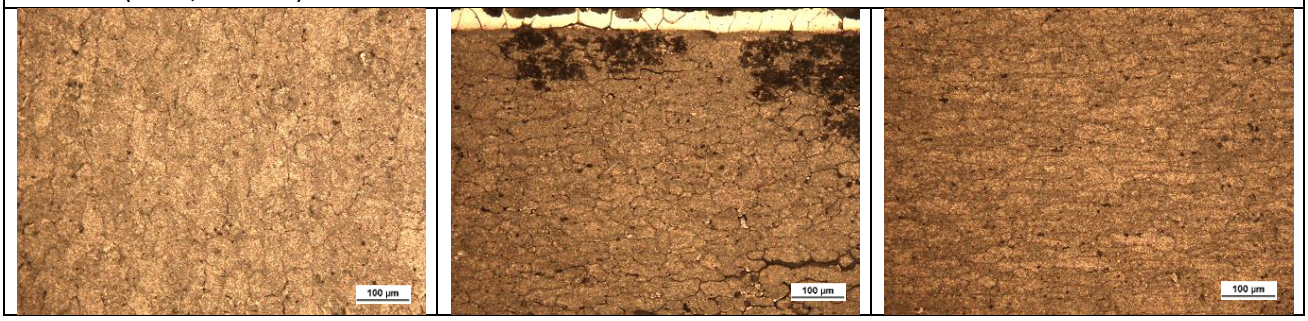
JU88-A1 (3125, 1.0 mm)



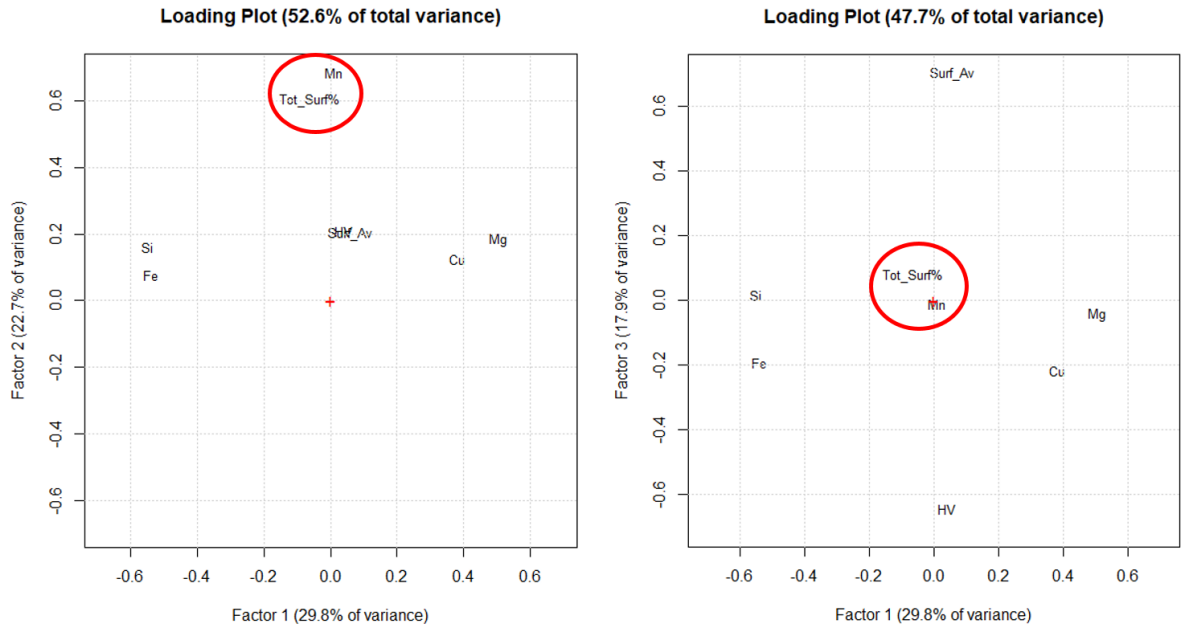
JU88-A2 (3125, 1.9 mm)



JU88-B1 (3125, 1.0 mm)



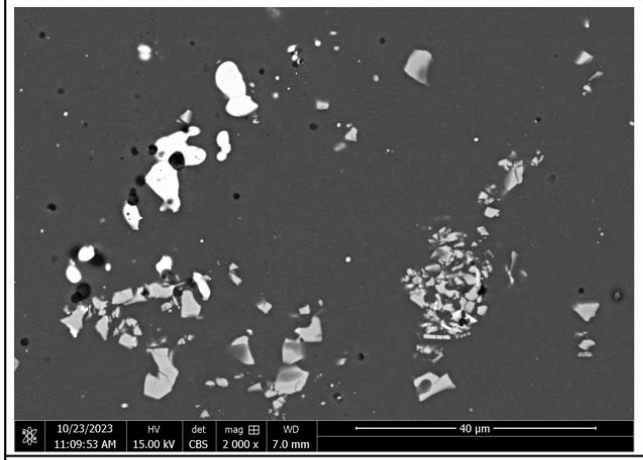
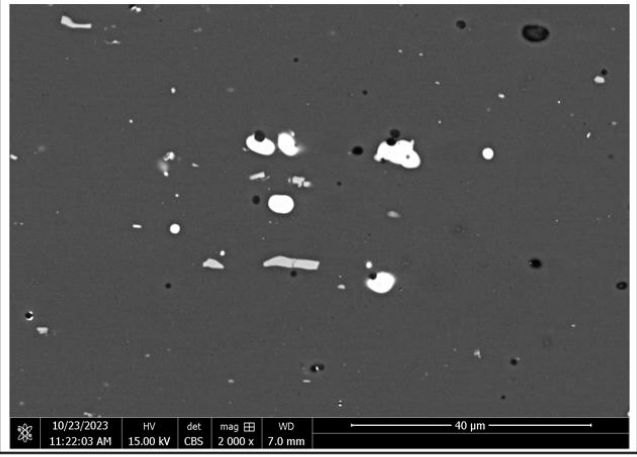
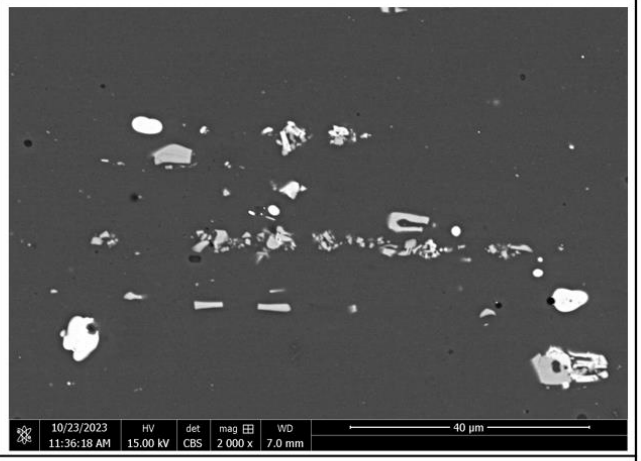
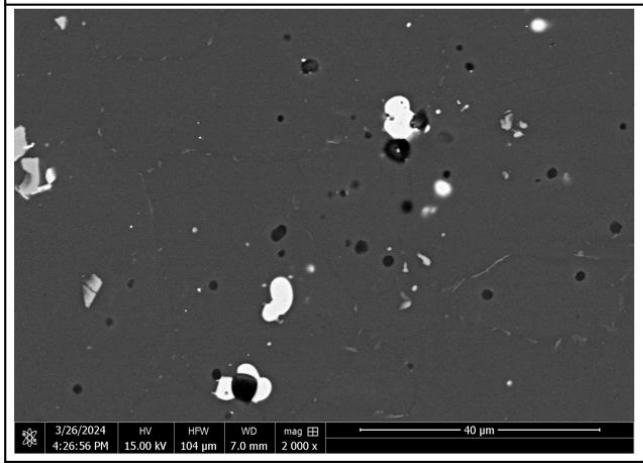
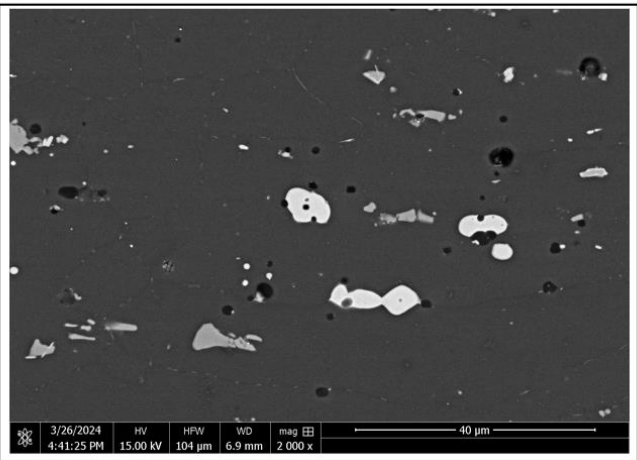
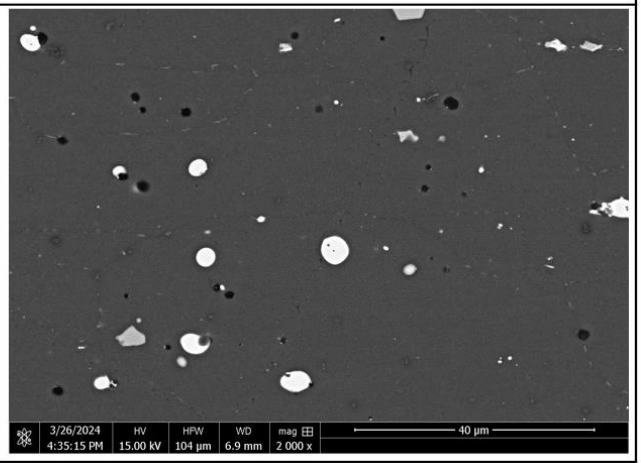
SI 4. PCA loadings plots for the sampling group of the study



The variables considered are the composition in wt.% (Cu, Mg, Si, Mn, Fe), the total proportion of intermetallics in the alloy (Tot_Surf%), the average size of an intermetallic in the alloy (Surf_Av) and the $HV_{0.3}$ hardness.

The variance is explained at 70% by three main factors. Factor 1 (contributing 29.8% of the variance) is influenced by Si and Fe (at negative loadings) and Mg and Cu (at positive loadings). These two groups seem anti-correlated. Factor 2 (contributing 22.7% of the variance) is mainly influenced by Mn content and the total proportion of intermetallics, that are strongly positively correlated. Factor 3 (contributing 17.9% of the variance) is influenced by the size of intermetallics and hardness, that result anti-correlated. Hardness seems positively influenced by Cu and Fe content.

SI 5. JU88-B3 sample before and after receiving T4 treatment – SEM microstructure observation (by backscattered electrons) – Magnification x2000

Rolling plane RP	Transverse plane TP	Normal plane NP
JU88-B3 as-received state (3115, 1.0 mm)		
		
JU88-B3 T4 state (3115, 1.0 mm)		
		

SI 6. Elemental analysis by SEM-EDS and ICP-OES for two pieces from the sampling group studied. The standard deviation obtained after averaging 9 measurements was added to the SEM-EDS values.

		Composition (wt.%)						
Sample	**Elemental analysis**	**Al**	**Cu**	**Mg**	**Si**	**Mn**	**Fe**	**Other**
JU88-A3	SEM-EDS	Base	4.7 ± 0.5	0.9 ± 0.1	0.6 ± 0.1	0.7 ± 0.1	0.4 ± 0.1	/
	ICP-OES	Base	4.45 ± 0.02	0.87 ± 0.04	0.74 ± 0.01	0.69 ± 0.01	0.396 ± 0.004	Ti : 0.01 Cr : 0.01
JU88-B3	SEM-EDS	Base	4.5 ± 0.2	0.9 ± 0.1	0.5 ± 0.1	0.5 ± 0.1	0.4 ± 0.1	Zn : 0.1 ± 0.1
	ICP-OES	Base	4.07 ± 0.08	0.83 ± 0.02	0.47 ± 0.01	0.51 ± 0.01	0.37 ± 0.01	Zn : 0.05 Ti : 0.005