

Fig 1

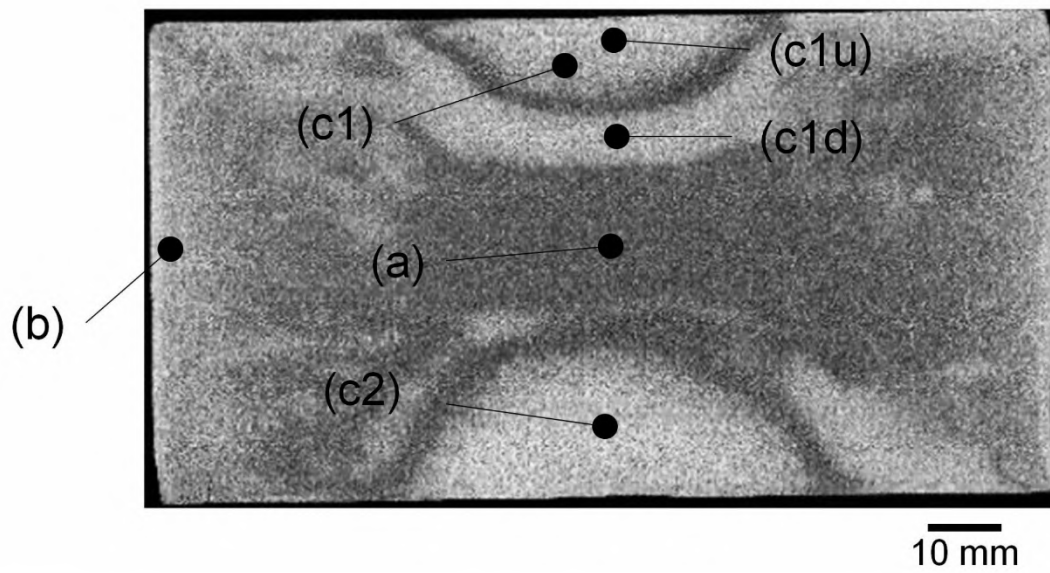


FIG 2

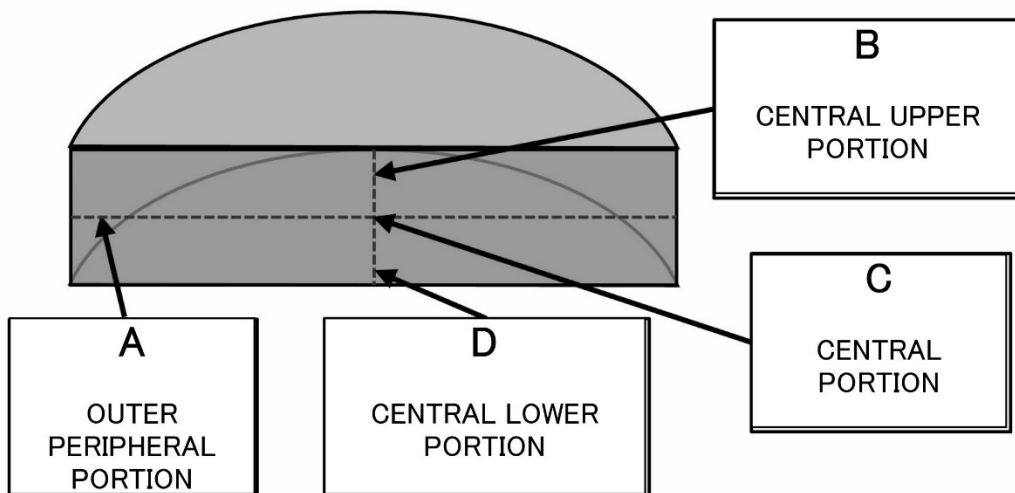


FIG 3

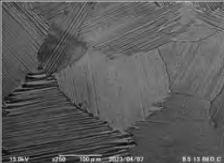
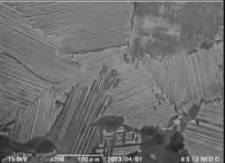
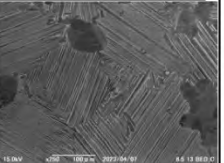
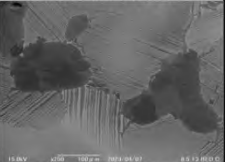
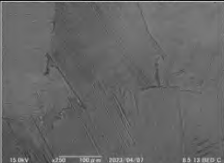
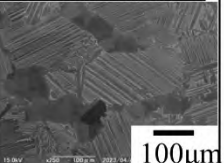
position sample	A	B	C	D
No.1 NO HOLDING IN MIDDLE OF HEATING (COMPARATIVE EXAMPLE 1)	 Al:43.1%	 Al:44.7%	 Al:47.2%	 Al:45.4%
No.2 HOLDING AT 600°C FOR 1 h (EXAMPLE)	 Al:44.3%	 Al:44.6%	 Al:44.2%	 Al:44.8%
No.3 HOLDING AT 800°C FOR 1 h (COMPARATIVE EXAMPLE 2)	 Al:43.7%	 Al:46.9%	 Al:48.1%	 Al:46.0%

FIG 4

	RAW MATERIAL POWDER	RESULT OF TENSILE TEST OF SINTERED BODY				EVALUATION
		0.2% PROOF STRESS (MPa)	TENSILE STRENGTH (MPa)	ELONGATION (%)	REDUCTION OF AREA (%)	
EXAMPLE 1	A	403	534	0.34	1.0	○ Good
EXAMPLE 2	B	452	535	0.28	1.0	○ Good
COMPARATIVE EXAMPLE	C	—	435	0.08	0.5	× Bad

FIG 5

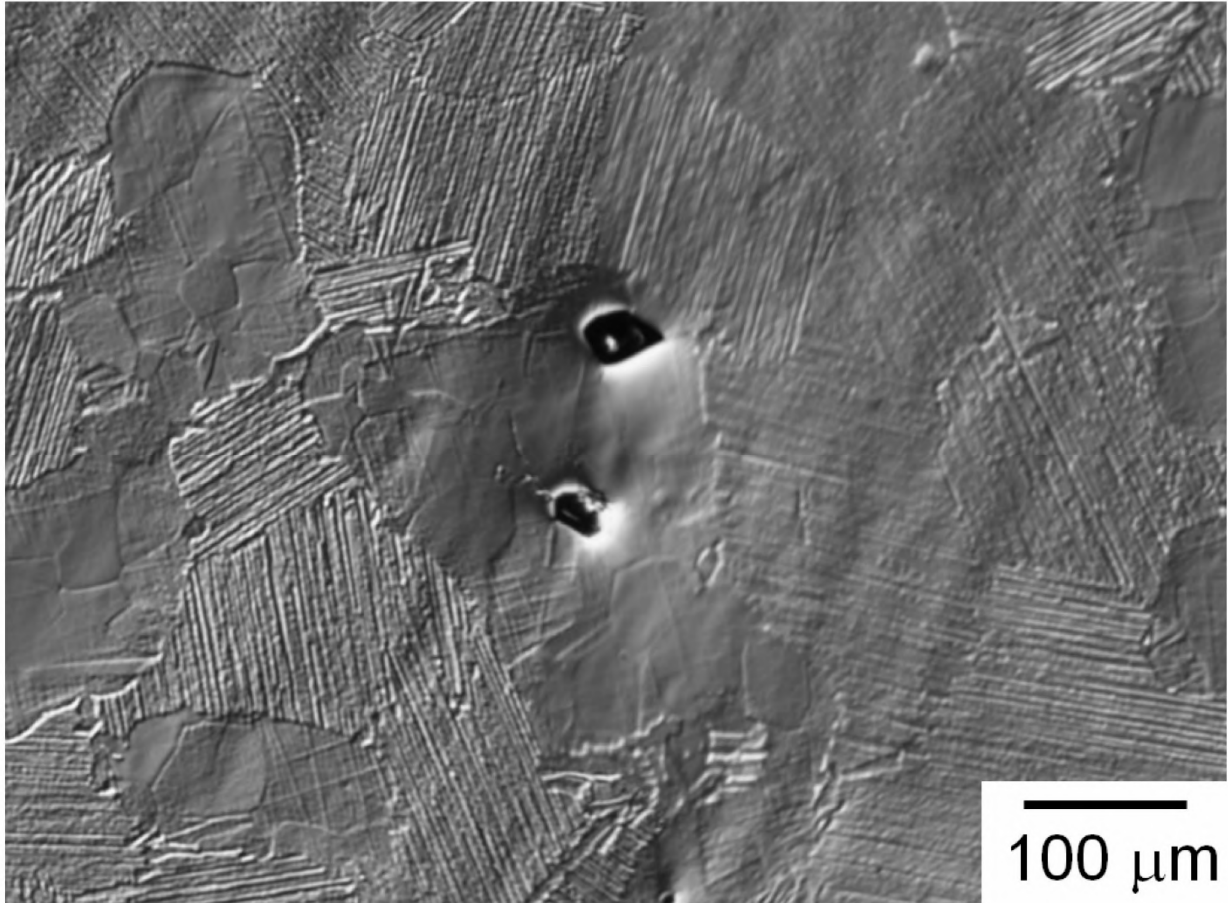


FIG 6

SAMPLE NO.		AFTER LASER LAMINATION (TEMPORARY SINTERING)	AFTER HIP TREATMENT (FINAL SINTERING)
02	DIMENSIONS	10×10×10 mm	9.5×9.5×9.7mm
	WEIGHT	3.54g	3.61g
	VOID CONTENT	13.7%	0%
06	DIMENSIONS	10×10×10 mm	9.3×9.3×9.2 mm
	WEIGHT	3.10g	3.16g
	VOID CONTENT	24.4%	0%

FIG 7

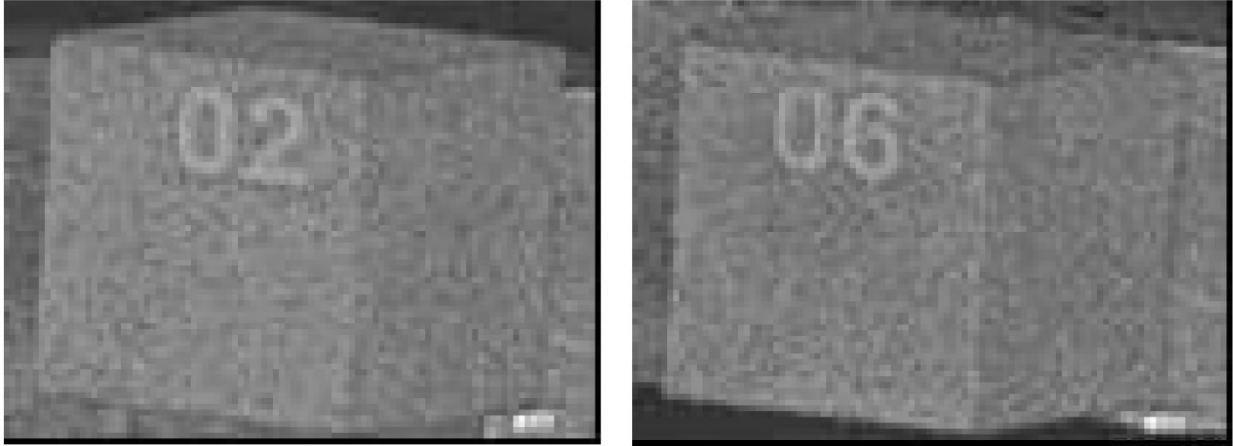


FIG 8

	COOLING RATE (°C/min.)	RESULT OF TENSILE TEST			
		0.2% PROOF STRESS (MPa)	TENSILE STRENGTH (MPa)	ELONGATION (%)	REDUCTION OF AREA (%)
EXAMPLE 1	16.5	550	670	1.0	0.8
EXAMPLE 2	5.0	476	609	1.4	2.4

FIG 9

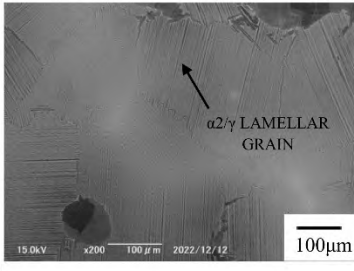
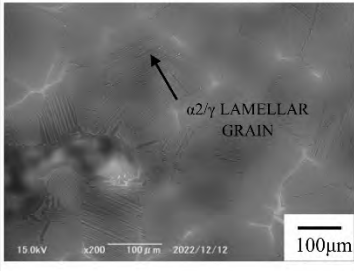
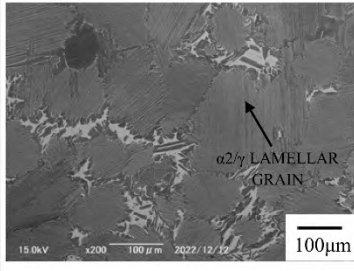
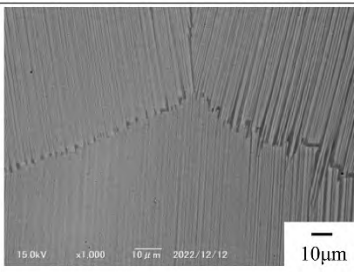
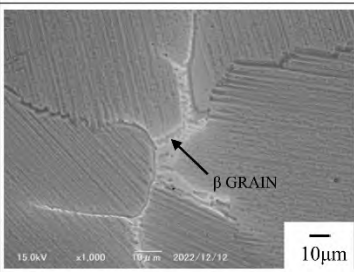
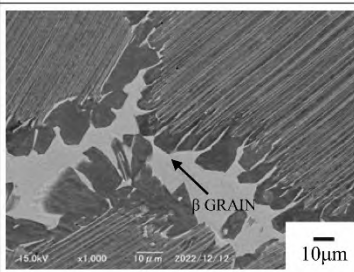
COMPOSITION	Ti:55 at.% Al:45 at.% (COMPARATIVE EXAMPLE: GRAIN TENDS TO COARSEN BECAUSE OF ABSENCE OF β PHASE)	Ti:55 at.% Al:45 at.% Nb: 4 at.% (EXAMPLE 1)	Ti:55 at.% Al:45 at.% Cr: 4 at.% (EXAMPLE 2)
STRUCTURE AT LOW MAGNIFICATION			
STRUCTURE AT HIGH MAGNIFICATION			

FIG 10

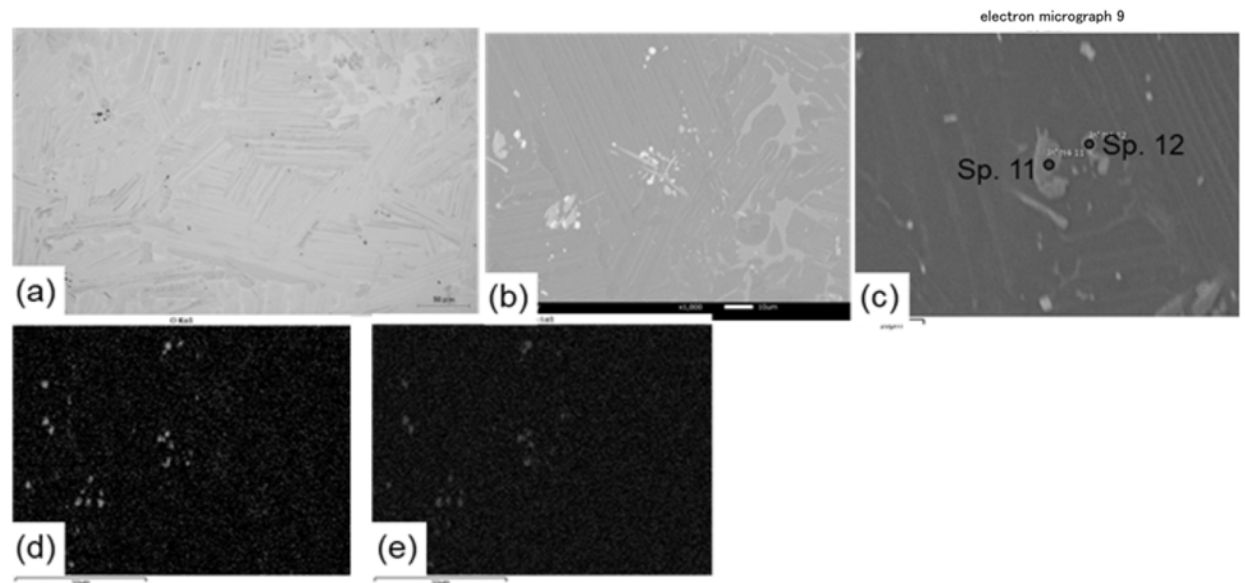
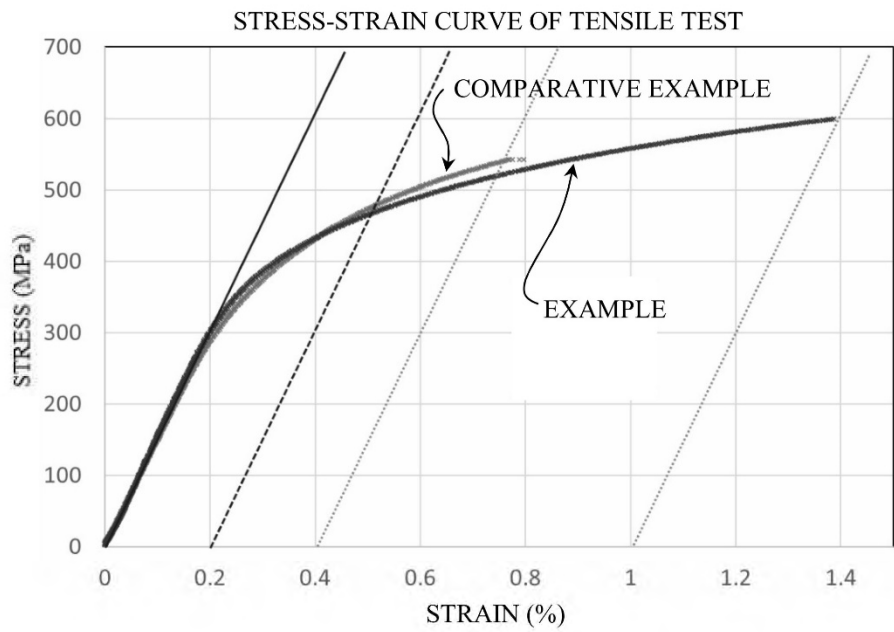


FIG 11

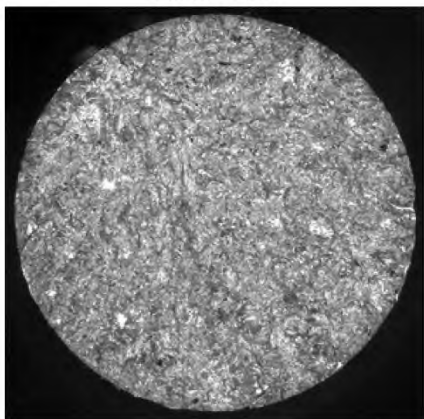
Sp.11	B	Ti	Nb	W	total	TiB ₂
at%	62.31	29.11	4.49	4.08	100	

Sp.12	O	Al	Ti	Nb	La	W	total	LaO ₂ , LaAlO ₃
at%	59.49	6.06	6.31	0.28	27.68	0.19	100	

FIG 12



EXAMPLE



COMPARATIVE EXAMPLE

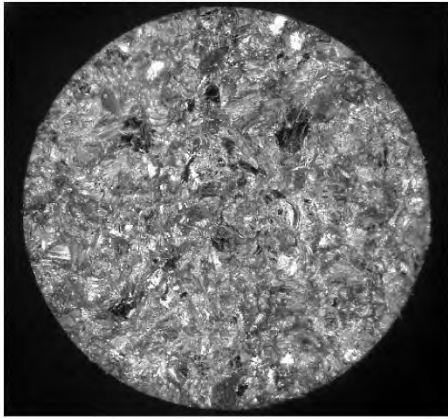


FIG 13

	Al at%	Cr at%	Nb at%	W at%	La at%	B at%	O at%	REDUCED ROUND BAR TENSILE TEST TENSILE STRENGTH (TS) RUPTURE ELONGATION (El)	800°C-200MPa RESULT OF CREEP TEST	DENSITY
EXAMPLE	45.5	1.5	2	0.6	0.1	0.6	0.37	TS:600MPa El:1.00%	Life:36.6h, ϵ_R : 18.2%	4.11
COMPARATIVE EXAMPLE	46	1.5	2	0.6	0	0	0.35	TS: 543MPa El:0.43%	Life : 95.5h, ϵ_R : 12.6%	4.11

FIG 14

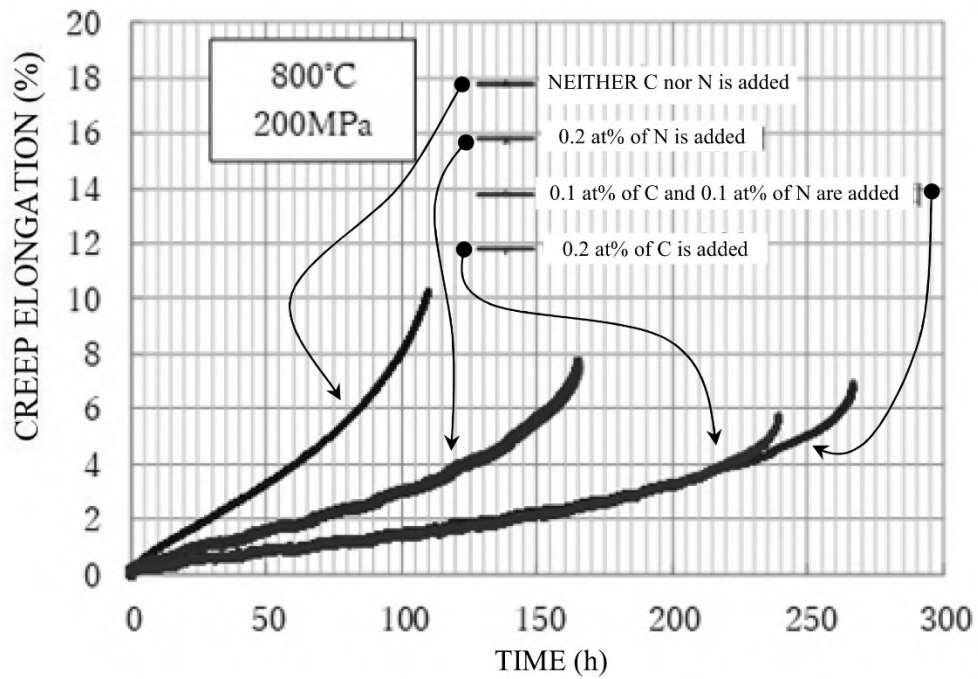


FIG 15

	Al at%	Cr at%	Nb at%	W at%	La at%	B at%	N at%	C at%	O at%	ROOM-TEMPERATURE TENSILE TEST DUCTILITY EVALUATION (TENSILE STRENGTH ×RUPTURE ELONGATION)	800°C-200MPa CREEP TEST RUPTURE LIFE	DENSITY
EXAMPLE 1	45.5	1.5	3	0.6	-	-	0.1	0.1	0.28	Good	Very Good	4.14
EXAMPLE 2	48	2	2	-	-	-	-	-	0.34	Good	Fair	3.99
EXAMPLE 3	45.1	1.5	2.1	0.5	0.075	0.45	-	0.15	0.33	Very Good	Fair	4.09
EXAMPLE 4	43.1	2.3	11.2	0.8			1.5		0.50	Fair	Excellent	4.59
COMPARATIVE EXAMPLE 1	43.5	0	4	Mo: 1	0.017	0.1	-		0.62	Poor	Good	4.16
COMPARATIVE EXAMPLE 2	45.1	1.3	2.3	0.5	0.18	1.1	-	-	0.29	Good	Poor	4.10

Poor→Fair→Good→Very Good→Excellent

FIG 16

