

Supplementary Information

Machine learning inverse design of high-strength mid-temperature Ag-based solders

Chengchen Jin ^a, Kai Xiong ^{a,1}, Yingwu Wang ^{a,d,*}, Shunmeng Zhang ^a, Yunyang Ye ^a, Hui Fang ^c, Aimin Zhang ^d, Hua Dai ^{d,*}, Yong Mao ^a

^a Materials Genome Institute, National Center for International Research on Photoelectric and Energy Materials, School of Materials and Energy, Yunnan University, Kunming 650091, China

^b Kunming Institute of Physics, North Night Vision Science and Technology Research Institute Group Co. Ltd, Kunming 650223, China

^c Kunming Institute of Precious Metals, Yunnan Precious Metals Laboratory Co., Ltd, Kunming 650106, China

^d Advanced Computing Center, School of Engineering, Yunnan University, Kunming, 650091, China

Table. S1 Ag-Based solder basic Dataset

No.	Alloy composition and content (wt %)										Temperature (°C)		Performance										Resource	
	Ag	Cu	Zn	Cd	In	Sn	Ga	Bi	Ni	Ti	Other	TS	TL	Hardness HV	Strength MPa	Welding Method	Seam Width mm	Welding Temperature °C	Time min	τ _f MPa	σ _b MPa	Base metal	Fracture Mode and Location	
1	69	27					4					760.7	772.8			VB		810	10	284.4		Kovar	brittle-interface	[1]
2	69	27					4					760.7	772.8			VB		840	10	296.9		Kovar		[1]
3	69	27					4					760.7	772.8			VB		870	10	339.6		Kovar		[1]
4	69	27					4					760.7	772.8			VB		900	10	276.6		Kovar	ductile-solder	[1]
5	69	27					4					760.7	772.8			VB		930	10	267.3		Kovar		[1]
6	69	27					4					760.7	772.8			VB		960	10	248.2		Kovar		[1]
7	69	27					4					760.7	772.8			VB		870	5	314.2		Kovar		[1]
8	69	27					4					760.7	772.8			VB		870	15	307		Kovar		[1]

¹Corresponding authors, E-mails: xiongkai@ynu.edu.cn (K. Xiong), 370076779@ynu.edu.cn (Y. Wang), daihua@ipm.com.cn (H. Dai).

48	0.1	1				93.8		0.1		Sb: 5						0.5	280	0.5	84		Cu		[10]	
49	0.5	0.5				93.9		0.1		Sb: 5						0.5	280	0.5	93		Cu	ductile-Base metal	[10]	
50	3	0.5				96.5										0.5	280	0.5	70		Cu		[10]	
51	42	44	3			10		1							610	IB		654.3	22s	170		YG16/45 steel		[11]
52	42	41	6			10		1			595	627			500	IB		629.7	23s	260		YG16/45 steel		[11]
53	42	38	9			10		1			577	613			475	IB		629.7	23s	322		YG16/45 steel		[11]
54	42	35	12			10		1							395	IB		629.7	23s	224		YG16/45 steel		[11]
55	48	38.1	3.5			10		0.4			598	631			600	IB		646.6	24s			YG16/45 steel		[11]
56	48	39.1	2.5			10		0.4			609	640			613	IB		646.6	24s			YG16/45 steel		[11]
57	50	34	16													VB	0.1	900	2	87		TiAl/40 Cr		[12]
58	50	34	16													VB	0.1	900	10	100		TiAl/40 Cr		[12]
59	50	34	16													VB	0.1	900	20	190		TiAl/40 Cr		[12]
60	50	34	16													VB	0.1	900	30	180		TiAl/40 Cr		[12]
61	50	34	16													VB	0.1	900	40	150		TiAl/40 Cr		[12]
62	88.29	11						0.66		Ce:0.05				278	345									[13]
63	60	35									680	767					0.1	817	10	210		Cu		[14]
64	60	30									602	718					0.1	768	10	228		Cu		[14]
65	60	25									580	680					0.1	730	10	210		Cu		[14]

66	60	20								521	640				0.1	690	10	181		Cu		[14]	
67	60	15								514	609				0.1	659	10	185		Cu		[14]	
68	60	35								680	767				0.1	817	10	210		Cu		[14]	
69	60	30								602	718				0.1	768	10	228		Cu		[14]	
70	60	25								580	680				0.1	730	10	210		Cu		[14]	
71	60	20								521	640				0.1	690	10	181		Cu		[14]	
72	60	15								514	609				0.1	659	10	185		Cu		[14]	
73	16.5	46.06	35.44		2													270		H62/304		[15]	
74	16.5	44.9	34.6		2	2												368		H62/304		[15]	
75	16.5	47.09	34.26		2				Ce:0.15									340		H62/304		[15]	
76	16.5	46.65	32.7		2	2			Ce:0.15									378		H62/304		[15]	
77	3	0.5			96.5					217.1 6	258.16		31										[16]
78	2	0.5	1		96.5					215.5 7	255.79		31.9										[16]
79	2	0.5	0.5		96.5	0.5				214.9 3	258.02		38.2										[16]
80	2	0.5			96.5	1				213.3 3	257.22		43.7										[16]
81	0.1	1.5	98.3						Zr:0.1				115.5										[17]
82	0.5	1.5	97.9						Zr:0.1				139.3										[17]
83	1	1.5	97.4						Zr:0.1				117.8										[17]
84	68.8	26.7							4.5	779				VB			850	60	15		C/ stainless steel		[18]
85	68.8	26.7							4.5	779				VB			900	60	20.5		C/ stainless		[18]

104	3	0.5			65.5				Sb:31	321	368.3	39	71									[20]
105	3	0.5			96.5					216.3	221.5	12.5	29									[20]
106	3	0.5			71.5				Sb:25	318.3	342	35	62									[20]
107	3	0.5			68.5				Sb:28	314.6	353.3	37	67									[20]
108	3	0.5			65.5				Sb:31	321	368.3	39	71									[20]
109	0.5	0.7			97.8	1				213.5	229.1											[21]
110	1	0.7			97.3	1				214.2	226.7											[21]
111	1.5	0.7			96.8	1				214.7	220.2											[21]
112	3.26	0.73			96.01					217.4	222.8			IB					99.8	Cu		[22]
113	1.52	0.82			97.66					217.6	224.4			IB					70.8	Cu		[22]
114	1.06	0.9			98.04					217.5	226.8			IB					72	Cu		[22]
115	0.31	0.7			98.99					217.4	227.9			IB					52	Cu		[22]
116	69.5	27						3.5						VB		850	10	16		C		[23]
117	69.5	27						3.5						VB		880	10	18		C		[23]
118	69.5	27						3.5						VB		900	10	20		C		[23]
119	69.5	27						3.5						VB		910	10	20		C		[23]
120	69.5	27						3.5						VB		940	10	12		C		[23]
121	69.5	27						3.5						VB		900	5	11		C		[23]
122	69.5	27						3.5						VB		900	30	20		C		[23]
123	69.5	27						3.5						VB		900	60	20		C		[23]
124	69.5	27						3.5						VB		900	90	16		C		[23]
125	69.5	27						3.5						VB		850	10	16		C		[23]
126	69.5	27						3.5						VB		880	10	18		C		[23]
127	69.5	27						3.5						VB		900	10	20		C		[23]

128	69.5	27							3.5					VB		910	10	20		C		[23]
129	69.5	27							3.5					VB		940	10	12		C		[23]
130	69.5	27							3.5					VB		900	5	11		C		[23]
131	25	40	34		1									IB				112	205	Q235		[24]
132	30	37	32		1									IB				85	120	Q235		[24]
133	0.25	0.5			96.25		3			230.1		20.7		IB	0.2					Cu		[25]
134	0.5	0.5			96		3			229.3		21.8		IB	0.2			23.7		Cu		[25]
135	0.75	0.5			95.75		3			228.9		22.76		IB	0.2					Cu		[25]
136	1	0.5			95.5		3			226.9		24.2		IB	0.2			28.5		Cu		[25]
137	34	26	21	19										VB	0.1	750	5	130		C17200		[26]
138	34	26	21	19										VB	0.1	750	10	141		C17200		[26]
139	34	26	21	19										VB	0.1	750	15	152		C17200		[26]
140	34	26	21	19										VB	0.1	750	5	130		C17200		[26]
141	34	26	21	19										VB	0.1	750	10	141		C17200		[26]
142	34	26	21	19										VB	0.1	750	15	152		C17200		[26]
143	34	26	21	19										VB	0.1	750	20	172		C17200		[26]
144	17	47.56	35.44		0					770	820						268		H62/304		[27]	
145	17	45.9	34.6		2	0.5				757	817						275		H62/304	brittle-interface	[27]	
146	17	45.74	34.26		2	1				750	805						325		H62/304	brittle-interface	[27]	
147	17	44.81	34.19		2	2				725	796						368		H62/304	ductile-interface	[27]	
148	17	44.82	33.18		2	3				724	794						313		H62/304	ductile-interface	[27]	
149	17	42.3	32.7		2	6				721	790						288		H62/304		[27]	

150	61	22	15		2					612.1	704.8			LB					315	TiNi/SS		[28]
151	58	22	15		5					609.6	678.8			LB					332	TiNi/SS		[28]
152	55	22	15		8					606.2	657			LB					341	TiNi/SS		[28]
153	58	22	18		2					613.1	690.4			LB					324	TiNi/SS		[28]
154	55	22	18		5					603.5	650			LB					362	TiNi/SS		[28]
155	52	22	18		8					590	635.3			LB					353	TiNi/SS		[28]
156	61	22	15		2					612.1	704.8			LB					315	TiNi/SS		[28]
157	58	22	15		5					609.6	678.8			LB					332	TiNi/SS		[28]
158	55	22	15		8					606.2	657			LB					341	TiNi/SS		[28]
159	58	22	18		2					613.1	690.4			LB					324	TiNi/SS		[28]
160	55	22	18		5					603.5	650			LB					362	TiNi/SS		[28]
161	52	22	18		8					590	635.3			LB					353	TiNi/SS		[28]
162	25.7	40.6	31.7		2									IB		790	10s		440	H612/10 steel		[29]
163	29.9	35.7	32.5		1.9									IB		780	10s		430	H612/10 steel		[29]
164	44.3	27.2	26.3		2.2									IB		730	10s		330	H612/10 steel		[29]
165	35.1	26.2	17.7	21										IB		750	10s		335	H612/10 steel		[29]
166	25.7	40.6	31.7		2									IB		790	10s		440	H612/10 steel		[29]
167	29.9	35.7	32.5		1.9									IB		780	10s		430	H612/10 steel		[29]
168	44.3	27.2	26.3		2.2									IB		730	10s		330	H612/10 steel		[29]
169	25.7	40.6	31.7		2									IB		790	10s		440	H612/10 steel		[29]

170	29.9	35.7	32.5			1.9										IB		780	10s		430	H612/10 steel		[29]
171	13	54	33													VB	0.1	750	15	47		TiC/stee l		[30]
172	13	54	33													VB	0.1	800	15	99		TiC/stee l		[30]
173	13	54	33													VB	0.1	850	15	101		TiC/stee l		[30]
174	13	54	33													VB	0.1	900	15	96		TiC/stee l		[30]
175	13	54	33													VB	0.1	950	15	43		TiC/stee l		[30]
176	13	54	33													VB	0.1	1000	15	7		TiC/stee l		[30]
177	13	54	33													VB	0.1	850	20	95		TiC/stee l		[30]
178	13	54	33													VB	0.1	850	25	55		TiC/stee l		[30]
179	13	54	33													VB	0.1	850	30	56		TiC/stee l		[30]
180	13	54	33													VB	0.1	850	5	5		TiC/stee l		[30]
181	13	54	33													VB	0.1	850	10	42		TiC/stee l		[30]
182	13	54	33													VB	0.1	850	20	95		TiC/stee l		[30]
183	13	54	33													VB	0.1	850	25	55		TiC/stee l		[30]
184	13	54	33													VB	0.1	850	30	56		TiC/stee l		[30]
185	72	28														VB	0.05	880	15	45		TiAl/Si3 N4	interface	[31]

186	72	28												VB	0.05	900	15	108		TiAl/Si3 N4	Base metal	[31]
187	72	28												VB	0.05	920	15	87		TiAl/Si3 N4	Base metal	[31]
188	70	27.5						2						VB		860		172		YG18/40 Cr	brittle- interface	[32]
189	70	27.5						2						VB		880		221		YG18/40 Cr	ductile- solder	[32]
190	70	27.5						2						VB		900		235		YG18/40 Cr	ductile- solder	[32]
191	70	27.5						2						VB		920		193		YG18/40 Cr	brittle- Base metal	[32]
192	68.8	26.7						4.5		870				VB		900	10	25		C/316		[33]
193	49	16	23					4.5		Mn:7.5	625	705		IB	0.12	710	0.5	314		WC- Co/steel		[34]
194	49	16	23					4.5		Mn:7.5	625	705		IB	0.12	730	0.5	330		WC- Co/steel		[34]
195	49	16	23					4.5		Mn:7.5	625	705		IB	0.12	750	0.5	342		WC- Co/steel		[34]
196	49	16	23					4.5		Mn:7.5	625	705		IB	0.12	770	0.5	366		WC- Co/steel		[34]
197	49	16	23					4.5		Mn:7.5	625	705		IB	0.12	770	1s	353		WC- Co/steel		[34]
198	49	16	23					4.5		Mn:7.5	625	705		IB	0.12	790	0.5	343		WC- Co/steel		[34]
199	49	16	23					4.5		Mn:7.5	625	705		IB	0.12	810	0.5	325		WC- Co/steel		[34]
200	49	16	23					4.5		Mn:7.5	625	705		IB	0.12	770	1s	353		WC- Co/steel		[34]
201	49	16	23					4.5		Mn:7.5	625	705		IB	0.12	770	1	335		WC- Co/steel		[34]
202	49	16	23					4.5		Mn:7.5	625	705		IB	0.12	770	1.5	307		WC-		[34]

250	3				5	90		2				194.7	215												[42]
251	3				10	84		3				193	206												[42]
252	72	28										780						950	0.5	165		TiAl		[43]	
253	72	28										780						950	1	340		TiAl		[43]	
254	72	28										780						950	1.5	330		TiAl		[43]	
255	72	28										780						950	2	290		TiAl		[43]	
256	72	28										780						950	3	270		TiAl		[43]	
257	17	45.79	35.21			2						771.3	824.6			FB				262		H62/304		[44]	
258	17	46.8	34.15			2					Ce:0.05	765.7	819.6			FB				274		H62/304		[44]	
259	17	46.76	34.14			2					Ce:0.1	753.2	819.3			FB				314		H62/304		[44]	
260	17	46.73	34.12			2					Ce:0.15	749.6	815.6			FB				340		H62/304		[44]	
261	17	46.65	34.05			2					Ce:0.3	735.8	813.2			FB				317		H62/304		[44]	
262	17	46.54	33.96			2					Ce:0.5	736.9	809.3			FB				261		H62/304		[44]	
263	0.7	99				0.3						227			83.2		1	249.1				53	Cu		[45]
264	0.7	98.95				0.3					Mn:0.05			87.1		1	249.1				57	Cu		[45]	
265	0.7	98.9				0.3					Mn:0.1			91.5		1	249.1				59	Cu		[45]	
266	0.7	98.85				0.3					Mn:0.15			90.5		1	249.1				56	Cu		[45]	
267	48.31	33.50	15.8			2.39									IB		760-780				351	H62/304		[46]	
268	47.26	32.24	15.7			4.80									IB		760-780				371	H62/304		[46]	
269	46.85	31.60	15.53			6.02									IB		760-780				394	H62/304		[46]	
270	48.31	33.50	15.8			2.39									IB		760-780				351	H62/304		[46]	
271	47.26	32.24	15.7			4.80									IB		760-780				371	H62/304		[46]	
272	46.27	31.15	15.36			7.22									IB		760-780				378	H62/304		[46]	
273	47.26	32.24	15.7			4.80									IB		760-780				371	H62/304		[46]	

355	53	22	12		12					479	615											[58]
356	56	22	13		9					490	640											[58]
357	53	21.5	13.5		1	11				464	602					652	0.5		595			[58]
358	53	21.5	12.5		2	11				471	601					651	0.5		540			[58]
359	53	21.5	11.5		3	11				478	600					650	0.5		560			[58]
360	53	21.5	10.5		4	11				486	595					645	0.5		550			[58]
361	53	21.5	9.5		5	11				496	598					648	0.5		555			[58]
362	2	0.7			97.3							39.2										[59]
363	2	0.7			2	95.3						47.3										[59]
364	1.5		9		89	0.5				191.5	201.1										[60]	
365	1.5		9		89	0.5				191.5	201.1										[60]	
366	50.4	19.6			30					510.1	539.3											[61]
367	50.54	19.46			30				La:0.5	521.5	538.4											[61]
368	50.68	19.32			30				La:1	514.1	535.1											[61]
369	3	0.5			96.5							40.8										[62]
370	3.8	0.7			95.5				217													[63]
371	1	0.4			98.6							IB	0.23				23					[63]
372	2	0.4			97.6							IB	0.23				28					[63]
373	3	0.4			96.6							IB	0.23				32					[63]
374	4	0.4			95.6							IB	0.23				31					[63]
375	2	0.4			97.6							IB	0.23				28					[63]
376	5	0.4			95.6							IB	0.23				27					[63]
377	2	0.4			97.6							IB	0.23				28					[63]
378	3	0.4			96.6							IB	0.23				32					[63]

426	25	27	28	20						599	702											[72]	
427	25	30	25	20						611	716											[72]	
428	25	33	22	20						615	734											[72]	
429	25	36	19	20						623	755											[72]	
430	20	65			15					850			VB	0.075	900	10	348		A3steel			[73]	
431	25	59			16					800			VB	0.075	850	10	301		A3steel			[73]	
432	25	57			18					773			VB	0.075	823	10	315		A3steel			[73]	
433	20	61			19					781			VB	0.075	831	10	328		A3steel			[73]	
434	20	59,5			20,5					748			VB	0.075	798	10	310		A3steel			[73]	
435	15	63			22					766			VB	0.075	816	10	317		A3steel			[73]	
436	15	61			24					723			VB	0.075	773	10	248		A3steel			[73]	
437	15	59,8			20		2		Mn:3 Si:0,2	616	772		VB					298	306	A3steel			[73]
438	15	58,8			22				Mn:2 Si:0,2	603	747		VB					240	300	A3steel			[73]
439	15	59			22				Mn:2	614	758		VB					320	325	A3steel			[73]
440	15	60			20				Mn:3	622	765		VB					316	386	A3steel			[73]
441	45	30	25						660	725		VB					376	349	A3steel			[73]	
442	45	30	25						665	745					745-845							[74]	
443	30	40	30						678	766					766-871							[74]	
444	50	34	16						690	775					775-870							[74]	
445	45	30	29		1				664	700					700-800							[74]	
446	38	30	30		2				660	725					725-825							[74]	
447	35	33	30		2				660	740					740-840							[74]	
448	10	53	37						815	850		451				850-950							[75]

473	55	21	17		5	2				600	626										[77]
474	25.6	67.7			0.5				P:6.2	600.5	626.7										[77]
475	55	22	17		5	1				595	644										[77]
476	26	67			1				P:6	651	660										[77]
477	55	21	17		5	2				600	626										[77]
478	25.6	67.7			0.5				P:6.2	600.5	626.7										[77]
479	23.9	70.1			0.4				P:5.6	646.1	661.2		335.2				154.4		Cu	brittle	[77]
480	25.6	50.7	17		0.5				P:6.2	602.8	612.5										[77]
481	25.6	62.7			5	0.5			P:6.2	615.8	626.4										[77]
482	3.8	0.5			95.7					225				0.2			68		Cu		[78]
483	3.64	0.7			95.05				Mn:0.61	224				0.2			88		Cu		[78]
484	3	0.5			96.5							22									[79]
485	3	0.5							Ce:0.05			23									[79]
486	3	0.5			96.5							22									[79]
487	3	0.5							Ce:0.05			23									[79]
488	52	23	12		13					498	598										[80]
489	53	21.5	14.5		11					475	605										[80]
490	54	22	12		12					479	615										[80]
491	56	22	13		9					490	640	146			0.1	690			610		[80]
492	53	21.5	13.5		1	11				464	602	180			0.1	652			590	stainless steel	[80]
493	53	21.5	12.5		2	11				471	601	190			0.1	651			540	stainless steel	[80]
494	53	21.5	11.5		3	11				478	600	195			0.1	650			560	stainless steel	[80]
495	53	21.5	10.5		4	11				486	595	205			0.1	645			550	stainless	[80]

551	17	46.44	33.96			2				Ce:0.5	737	810							261		H62/304		[86]	
552	17	45.3	34.6			2	1			Ce:0.1									316		H62/304		[86]	
553	17	44.64	34.26			2	2			Ce:0.1									370		H62/304		[86]	
554	17	44.66	34.19			2	2			Ce:0.15									380		H62/304		[86]	
555	17	45.52	33.18			2	2			Ce:0.3									350		H62/304		[86]	
556	17	45.8	32.7			2	2			Ce:0.5									288		H62/304		[86]	
557	17	41.8	32.7			2	6			Ce:0.5									236		H62/304		[86]	
558	56	22	17			5					615.5	652.2	HV0.2: 141	347										[87]
559	55.7	22	17			5		0.3			617	653.3	HV0.2: 124	337										[87]
560	55.4	22	17			5		0.6			616.1	665.4	HV0.2: 115	372										[87]
561	55.7	22	17			5		0.3			617	653.3	HV0.2: 124	337										[87]
562	55.1	22	17			5		0.9			606.9	680.8	HV0.2: 100	344										[87]
563	56	22	17			5					615.5	652.2	HV0.2: 141	347										[87]
564	55.7	22	17			5		0.3			617	653.3	HV0.2: 124	337										[87]
565	65.1	25				9.9					685	732												[88]
566	63.8	24.4				9.9	1.9				629	708												[88]
567	61.8	23.6				9.8	4.8				589	686												[88]
568	59.3	22.9				9.9	7.9				575	620												[88]
569	57.9	22.5				9.8	9.8				560	572												[88]
570	61.1	22.2				9.9	6.8				558	596												[88]
571	30	33	35			2					690	770		FB						221	253	Brass	Base metal	[89]

572	30	32.5	35		2	0.5				665	720			FB					235	271	Brass	Base metal	[89]
573	30	32	35		2	1				663	700			FB					275	297	Brass	Base metal	[89]
574	30	31	35		2	2				654	702			FB					313	316	Brass	Base metal	[89]
575	30	30.5	35		2	2.5				649	710			FB					327	322	Brass	Base metal	[89]
576	30	30	35		2	3				638	701			FB					332	323	Brass	Base metal	[89]
577	30	29	35		1	2	3			621	676			FB					313	329	Brass	Base metal	[89]
578	30	28	35		2	2	3			608	629			FB					314	333	Brass	Base metal	[89]
579	30	27	35		3	2	3			601	617			FB					313	329	Brass	Base metal	[89]
580	30	32.5	35		0.5	2				685	751			FB							Brass		[89]
581	30	32	35		1	2				679	730			FB					326	310	Brass	Base metal	[89]
582	30	31	35		2	2				667	715			FB					325	317	Brass	Base metal	[89]
583	30	30.5	35		2.5	2				654	709			FB					323	322	Brass	Base metal	[89]
584	30	30	35		3	2				652	710			FB					315	320	Brass	Base metal	[89]
585	57.6	22.4			20					589	626												[90]
586	57.6	22.4			18	2				586	617												[90]
587	57.44	21.56			20	3				573	592												[90]
588	57.6	22.4			15	5				571	597												[90]
589	57.6	22.4			13	7				558	590												[90]
590	57.6	22.4			10	10				558	587												[90]
591	57.6	22.4			8	12				553	587												[90]
592	57.6	22.4			5	15				549	558												[90]
593	57.6	22.4			20					548	563												[90]
594	30	45	25							668.5	691.2			LB					190		copper		[91]
595	14.65	80.36							P:4.99	649.1	669.9			LB					184		copper		[91]

596	4.95	89.03							P: 6.02	645.6	696.9			LB					172		copper		[91]	
597	2.03	90.86							P: 7.11	687.4	691.2			LB					182		copper		[91]	
598	50	50								779	850		343										[91]	
599	92	8								779			343										[91]	
600	72	28								830	890		343										[91]	
601	10	53	37							815	850		451										[91]	
602	25	40	35							745	775		353										[91]	
603	45	30	25							677	743		386										[91]	
604	50	34	16							677	775		343										[91]	
605	50	15.5	16.5	18						627	760		419										[91]	
606	92	8								779			343										[91]	
607	72	28								830	890		343										[91]	
608	10	53	37							815	850		451										[91]	
609	25	40	35							745	775		353										[91]	
610	45	30	25							677	743		386										[91]	
611	57.6	22.4		20						562.1							580	5	147		Cu		[92]	
612	30	38	32							698	788			IB	0.02	810			220	185	201			[93]
613	30	37.5	32	0.5										IB	0.02	810			240	237	201			[93]
614	30	37	32	1										IB	0.02	810			255	335	201			[93]
615	30	36.5	32	1.5										IB	0.02	810			271	372	201			[93]
616	30	36	32	2						670	771			IB	0.02	810			295	382	201			[93]
617	30	35.5	32	2.5										IB	0.02	810			276	350	201			[93]
618	30	35	32	3										IB	0.02	810			248	284	201			[93]
619	30	34	32	4						627	749			IB	0.02	810			189	250	201			[93]

620	30	38	32							698	788			IB	0.02	810			220	185	201		[93]		
621	30	37.5	32		0.5									IB	0.02	810			240	237	201		[93]		
622	30	37	32		1									IB	0.02	810			255	335	201		[93]		
623	30	36.5	32		1.5									IB	0.02	810			271	372	201		[93]		
624	30	35	32		2	1				665	750			IB	0.02	810			337	455	201		[93]		
625	30	34	32		2	2				662	742			IB	0.02	810			357	470	201		[93]		
626	30	33	32		2	3				650	738			IB	0.02	810			403	511	201		[93]		
627	30	32	32		2	4				637	737			IB	0.02	810			302	482	201		[93]		
628	30	31	32		2	5				623	734			IB	0.02	810			209	246	201		[93]		
629	55	21	17		5				Ge:2	602	612.5			325	VB				150		copper		[94]		
630	45.3	29.7	25							684.6	735.7			IB	0.2						431	201	ductile-solder	[95]	
631	42.5	27.5	27.6							668.6	691.9			IB	0.2						445	201	ductile-solder	[95]	
632	47.5	17	22.5							679.8	701.1			IB	0.2						456	201	ductile-solder	[95]	
633	69	29						2						VB	0.3	865	30	227.6		20Crsteel I			[96]		
634	38.5	33.4							Ge:28.1	539	547													[97]	
635	37	43							Ge:20	539	622														[97]
636	0.3	0.7		99						216.1	226.2			37.3		0.5					42	Cu		[98]	
637	0.3	0.7		98.51					Al:0.49	217.8	227.6			53.2		0.5					46	Cu		[98]	
638	0.3	0.7		98.19					Al:0.81	219.6	230.1			53.9		0.5					41	Cu		[98]	
639	0.3	0.7		97.98					Al:1.02	220.7	233.5			54.5		0.5					35	Cu		[98]	
640	0.3	0.7		97.72					Al:1.28	221.9	234.8			55.7		0.5					32	Cu		[98]	
641	0.3	0.7		97.51					Al:1.49	222.9	238			55.4		0.5					29	Cu		[98]	

642	0.3	0.7				98.51				Al:0.49	217.8	227.6		53.2		0.5				46	Cu		[98]
643	0.3	0.7				98.19				Al:0.81	219.6	230.1		53.9		0.5				41	Cu		[98]
644	0.3	0.7				97.98				Al:1.02	220.7	233.5		54.5		0.5				35	Cu		[98]
645	3.8	0.7				96.5							17	53.5									[99]
646	3.8	0.7				94.5	2						25	76.5									[99]
647	3.8	0.7				92.5	4						34	101									[99]
648	40.7	19.3							Al:40	500				LB	0.1			189.7		2024Al			[100]
649	48.31	33.5	15.8			2.39														358			[101]
650	47.26	32.24	15.7			4.8														376			[101]
651	46.98	31.83	15.61			5.58														388			[101]
652	46.85	31.6	15.53			6.02														406			[101]
653	46.27	31.15	15.36			7.22														382			[101]
654	33.23	35.8	26.92			4.05														382			[101]
655	33.05	35.76	26.67			4.52														408			[101]
656	32.73	35.68	26.6			4.99														418			[101]
657	32.56	35.55	26.38			5.51														430			[101]
658	32.24	35.29	26.04			6.4														407			[101]
659	18	20	0.2						Si:5 Al:56.8	494	515			VB		535	30	629		2219/304			[102]
660	2	92							P:6	645	825									182			[103]
661	5	89							P:6	645	815									171			[103]
662	15	80							P:5	645	800									184			[103]
663	68.8	26.7						4.5						VB		820	10	37		AMBT/3 04			[104]
664	68.8	26.7						4.5						VB		850	10	45		AMBT/3 04			[104]

665	68.8	26.7							4.5					VB			880	10	48		AMB/T/3 04		[104]
666	68.8	26.7							4.5					VB			880	10	48		AMB/T/3 04		[104]
667	68.8	26.7							4.5					VB			910	10	35		AMB/T/3 04		[104]
668	54	21	25											VB	0.15	740	10	60		Ceramic /Invor		[105]	
669	54	21	25											VB	0.15	820	10	120		Ceramic /Invor		[105]	
670	54	21	25											VB	0.15	850	10	120		Ceramic /Invor		[105]	
671	54	21	25											VB	0..15	880	10	128		Ceramic /Invor		[105]	
672	54	21	25											VB	0.15	910	10	160		Ceramic /Invor		[105]	
673	54	21	25											VB	0.15	940	10	70		Ceramic /Invor		[105]	
674	54	21	25											VB	0.15	740	10	60		Ceramic /Invor		[105]	
675	54	21	25											VB	0.15	820	10	120		Ceramic /Invor		[105]	
676	54	21	25											VB	0.15	850	10	120		Ceramic /Invor		[105]	
677	54	21	25											VB	0..15	880	10	128		Ceramic /Invor		[105]	
678	54	21	25											VB	0.15	910	10	160		Ceramic /Invor		[105]	
679	54	21	25											VB	0.15	940	10	70		Ceramic /Invor		[105]	
680	10	48.95	38.5		1	1.5				Nd:0.05	770	795					850	1	400		304/cop per		[106]

681	10	49.3	38.1		1	1.5				Nd:0.1	758	786					850	1	401		304/cop per		[106]	
682	10	48.5	37.9		2	1.5				Nd:0.1	757	784					850	1	430		304/cop per		[106]	
683	10	48.65	37.6		2	1.5				Nd:0.25	755	780					850	1	410		304/cop per		[106]	
684	10	48.3	37.7		2	1.5				Nd:0.5	755	778					850	1	360		304/cop per		[106]	
685	10	45.8	37.2		5	1.5				Nd:0.5	728	776					850	1	330		304/cop per		[106]	
686	10	48.95	38.5		1	1.5				Nd:0.05	770	795					850	1	400		304/cop per		[106]	
687	10	49.3	38.1		1	1.5				Nd:0.1	758	786					850	1	401		304/cop per		[106]	
688	10	48.5	37.9		2	1.5				Nd:0.1	757	784					850	1	430		304/cop per		[106]	
689	10	48.65	37.6		2	1.5				Nd:0.25	755	780					850	1	410		304/cop per		[106]	
690	10	48.3	37.7		2	1.5				Nd:0.5	755	778					850	1	360		304/cop per		[106]	
691	10	45.8	37.2		5	1.5				Nd:0.5	728	776					850	1	330		304/cop per		[106]	
692	70	26							4							0.05	880	10		459	NiTiNb		[107]	
693	54	21								Pd:25							0.1	980	10		593	NiTiNb		[107]
694	59	27.25			12. 5	1.25											0.05	780	10		528	NiTiNb		[107]
695	59	27.25			12. 5	1.25											0.05	780	30		516	NiTiNb		[107]
696	59	27.25			12. 5	1.25											0.05	780	60		525	NiTiNb		[107]
697	54	21								Pd:25							0.1	980	10		593	NiTiNb		[107]

698	59	27.25			12. 5	1.25									0.05	780	10		528	NiTiNb		[107]	
699	26.37	38.61	1.35					10.51		Mn:22.3 9 Si:0.42 P:0.35		880			IB			1	369		2Cr13 stainless steel		[108]
700	57.6	22.4			10	10					556	569				0.09				458			[109]
701	57.6	22.4			10	10					556	569				0.09				494			[109]
702	57.6	22.4			10	10					556	569				0.09				452			[109]
703	57.6	22.4			10	10					556	569				0.09				458			[109]
704	57.6	22.4			10	10					556	569				0.09				494			[109]
705	57.6	22.4			10	10					556	569				0.09				452			[109]
706	57.6	22.4			10	10					556	569				0.09				473			[109]
707	57.6	22.4			10	10					556	569				0.09				494			[109]
708	25	41	34								680	780											[110]
709	30	36	32								680	765											[110]
710	40	30.5	29.5								674	727											[110]
711	45	30	25								665	745											[110]
712	25	40	33		2						680	760											[110]
713	30	36	32		2						660	750											[110]
714	40	30	28		2						650	710											[110]
715	45	27	25		3						640	680											[110]
716	19.5		32.5		2.5					P:0.3	735.3	782.2			740	FB			171		1Cr18Ni 9Ti stainless steel		[110]
717	19.5		32.5		4.5					P:0.3	737.1	771.7			806	FB			187		1Cr18Ni		[110]

																			9Ti stainless steel			
718	19.5		32.5		6.5				P:0.3	679.8	758.1		816	FB				168		1Cr18Ni 9Ti stainless steel		[110]
719	19.5		32.5		8				P:0.3	656.2	738.8		744	FB				144		1Cr18Ni 9Ti stainless steel		[110]
720	19.5		32.5		6.5				P:0.1 La:0.1	734.1	786		830	FB				171		1Cr18Ni 9Ti stainless steel		[110]
721	19.5		32.5		6.5				P:0.1 La:0.3	677.9	767.4		853	FB				177		1Cr18Ni 9Ti stainless steel		[110]
722	19.5		32.5		6.5				P:0.1 La:0.5	674.9	766.1		882	FB				212		1Cr18Ni 9Ti stainless steel		[110]
723	19.5		32.5		8		1		P:0.3	661	742.7		775	FB				158		1Cr18Ni 9Ti stainless steel		[110]
724	19.5		32.5		8		2		P:0.3	682.8	748.2		825	FB				169		1Cr18Ni 9Ti stainless steel		[110]
725	19.5		32.5		8		4		P:0.3	698	743.9		740	FB				143		1Cr18Ni 9Ti		[110]

726	19.5		32.5		6.5				P:0.1 La:1	718.8	769.8		785	FB				174		1Cr18Ni 9Ti stainless steel
727	19.5		32.5		6.5			2	P:0.3 Mn:2 La:0.3	687.6	748.2									[110]
728	19.5		32.5		6.5			2	P:0.3 Mn:2 La:0.5	677.3	734.1									[110]
729	19.5		32.5		2.5				P:0.3	735.3	782.2		740	FB				99		Cu/1Cr1 8Ni9Ti stainless steel
730	19.5		32.5		4.5				P:0.3	737.1	771.7		806	FB				110		Cu/1Cr1 8Ni9Ti stainless steel
731	19.5		32.5		6.5				P:0.3	679.8	758.1		816	FB				100		Cu/1Cr1 8Ni9Ti stainless steel
732	19.5		32.5		8				P:0.3	656.2	738.8		744	FB				93		Cu/1Cr1 8Ni9Ti stainless steel
733	19.5		32.5		6.5			2	P:0.3 Mn:2 La:0.5	677.3	734.1									[110]
734	19.5		32.5		2.5				P:0.3	735.3	782.2		740	FB				99		Cu/1Cr1 8Ni9Ti

																			stainless steel			
735	19.5		32.5		4.5			P:0.3	737.1	771.7		806	FB					110		Cu/1Cr1 8Ni9Ti stainless steel		[110]
736	19.5		32.5		6.5			P:0.3	679.8	758.1		816	FB					100		Cu/1Cr1 8Ni9Ti stainless steel		[110]
737	19.5		32.5		8			P:0.3	656.2	738.8		744	FB					93		Cu/1Cr1 8Ni9Ti stainless steel		[110]
738	19.5		32.5		6.5			P:0.1 La:0.1	734.1	786		830	FB					111		Cu/1Cr1 8Ni9Ti stainless steel		[110]
739	19.5		32.5		6.5			P:0.1 La:0.3	677.9	767.4		853	FB					114		Cu/1Cr1 8Ni9Ti stainless steel		[110]
740	19.5		32.5		6.5			P:0.1 La:0.5	674.9	766.1		882	FB					159		Cu/1Cr1 8Ni9Ti stainless steel		[110]
741	19.5		32.5		8		1	P:0.3	661	742.7		775	FB					95		Cu/1Cr1 8Ni9Ti stainless steel		[110]
742	19.5		32.5		8		2	P:0.3	682.8	748.2		825	FB					122		Cu/1Cr1 8Ni9Ti stainless steel		[110]

762	40	16	17.9	25.8					0.2			595	605											[112]	
763	50	15.5	15.5	16					3			630	690											[112]	
764	34	36	27		3								730												[112]
765	56	22	17		5							620	650												[112]
766	40	25	30.5		3				1.5			634	640												[112]
767	50	21.5	27		1				0.5			650	670												[112]
768	72	28										779	779			VB	0.2	830	5	20				YSZ Ceramic/K ovar	[113]
769	72	28										779	779			VB	0.2	840	5	28				YSZ Ceramic/K ovar	[113]
770	72	28										779	779			VB	0.2	850	5	76				YSZ Ceramic/K ovar	[113]
771	72	28										779	779			VB	0.2	860	5	60				YSZ Ceramic/K ovar	[113]
772	72	28										779	779			VB	0.2	870	5	56				YSZ Ceramic/K ovar	[113]
773	72	28										779	779			VB	0.2	880	5	50				YSZ Ceramic/K ovar	[113]
774	72	28										779	779			VB	0.1	850	5	52				YSZ Ceramic/K ovar	[113]
775	72	28										779	779			VB	0.14	850	5	63				YSZ Ceramic/K ovar	[113]

776	72	28									779	779			VB	0.2	850	5	76			YSZ Ceramic/K ovar	[113]
777	72	28									779	779			VB	0.25	850	5	72			YSZ Ceramic/K ovar	[113]
778	72	28									779	779			VB	0.2	830	5	20			YSZ Ceramic/K ovar	[113]
779	72	28									779	779			VB	0.2	840	5	28			YSZ Ceramic/K ovar	[113]
780	72	28									779	779			VB	0.2	850	5	76			YSZ Ceramic/K ovar	[113]
781	72	28									779	779			VB	0.2	860	5	60			YSZ Ceramic/K ovar	[113]
782	72	28									779	779			VB	0.2	870	5	56			YSZ Ceramic/K ovar	[113]
783	72	28									779	779			VB	0.3	850	5	71			YSZ Ceramic/K ovar	[113]
784	72	28									779	779			VB	0.4	850	5	66			YSZ Ceramic/K ovar	[113]
785	64	34.5								1.5						954		60				TC4/ Ceramic	[114]
786	74.5	21								4.5						880	5	23				TC4/ Ceramic	[114]
787	74.5	21								4.5						900	5	27				TC4/ Ceramic	[114]

808	30	36	32							680	765										[117]	
809	40	30.5	29.5							674	727										[117]	
810	45	30	25							665	745										[117]	
811	25	40	33		2					680	760										[117]	
812	45	30	25						Si:0.05	665	745								213.1	Cu	Base metal	[118]
813	25	40	35						Si:0.05	700	790								208.2	Cu	Base metal	[118]
814	10	53	37						815	850									213.4	Cu	Base metal	[118]
815	60 at	10 at					10 at		Cr: 20 at					FB					130	GH4169	interface	[119]
816	2.2	13.7					11.6	60	Zr: 12.5	817	826			VB	0.03	860	20	131		TA1	ductile- brittle interface	[120]
817	2.2	13.7					11.6	60	Zr: 12.5	817	826			VB	0.03	880	20	136		TA1	ductile- brittle interface	[120]
818	2.2	13.7					11.6	60	Zr: 12.5	817	826			VB	0.03	900	20	172		TA1	ductile- brittle interface	[120]
819	2.2	13.7					11.6	60	Zr: 12.5	817	826			VB	0.03	920	20	88		TA1	ductile- brittle interface	[120]
820	2.2	13.7					11.6	60	Zr: 12.5	817	826			VB	0.03	940	20	55		TA1	ductile- brittle interface	[120]
821	2.2	13.7					11.6	60	Zr: 12.5	817	826			VB		900	20		260	TA1		[120]
822	2.2	13.7					11.6	60	Zr: 12.5		819			VB	0.03- 0.04	875	10		442	Ti6Al4V -TA2	TA2 interface	[121]
823	2.2	13.7					11.6	60	Zr: 12.5		819			VB	0.03- 0.04	875	10		463	Ti6Al4V -TA2	TA2 interface	[121]

824	2.2	13.7						11.6	60	Zr: 12.5		819				VB	0.03-0.04	875	10		469	Ti6Al4V-TA2	TA2 interface	[121]
825	2.2	13.7						11.6	60	Zr: 12.5		819				VB	0.03-0.04	875	10	259		Ti6Al4V-TA2		[121]
826	2.2	13.7						11.6	60	Zr: 12.5		819				VB	0.03-0.04	875	10	256		Ti6Al4V-TA2		[121]
827	2.2	13.7						11.6	60	Zr: 12.5		819				VB	0.03-0.04	875	10	270		Ti6Al4V-TA2		[121]
828	68.8	26.7						4.5										930	10	75.18		AlN		[122]
829	63	34.25			1				1.75									850	20	51		AlN		[122]
830	54	20.5			21.5				4									750				Al2O3		[122]
831	67	28			5			2										980	30	15		Al2O3		[122]
832	72	18			6			1	Zr:3									840	15	18		Al2O3		[122]
833	52	34.5						4		Mn:8						VB	0.2	890	10		720	YG6X-GH4169		[123]
834	52	34.5						4		Mn:8						VB	0.2	860	10		430.2	YG6X-GH4169		[124]
835	52	34.5						4		Mn:8						VB	0.2	890	10		715.3	YG6X-GH4169		[124]
836	52	34.5						4		Mn:8						VB	0.2	920	10		578	YG6X-GH4169		[124]
837	52	34.5						4		Mn:8						VB	0.2	950	10		425	YG6X-GH4169		[124]
838	72	28									780	780				VB	0.2	840	5	246.4		FeCrMo/MnCu	ductile-brITTLE	[125]
839	63	32.25							1.75		780	815				VB	0.05	840	1	213		Ti50Ni50		[126]
840	63	32.25							1.75		780	815				VB	0.05	840	3	243		Ti50Ni50		[126]
841	63	32.25							1.75		780	815				VB	0.05	840	5	173		Ti50Ni50		[126]

																		d-Cu				
858	64	25			10				1					VB		750	10	256.1		Diamon d-Cu		[129]
859	64	25			10				1					VB		780	10	216.2		Diamon d-Cu		[129]
860	64	25			10				1					VB		750	5	196.8		Diamon d-Cu		[129]
861	64	25			10				1					VB		750	20	217.2		Diamon d-Cu		[129]
862	64	25			10				1					VB		750	10	251.6		Diamon d-Cu		[130]
863	63.4	24.6			10				2					VB		750	10	168.1		Diamon d-Cu		[130]
864	62.6	24.4			10				3					VB		750	10	190.8		Diamon d-Cu		[130]
865	67.7	26.3			5				1					VB		750	10	161.1		Diamon d-Cu		[130]
866	60.5	23.5			15				1					VB		750	10	204.2		Diamon d-Cu		[130]
867	56.7	22.3			20				1					VB		750	10	246.1		Diamon d-Cu		[130]
868	10	48.34	40.16		1.5					784	821			FB		850		285		Cu-304	Cu	[131]
869	10	47.6	39.85		1	1.5				Ce:0.05	773	805		FB		850		287		Cu-304		[131]
870	10	47.74	39.21		1.5	1.5				Ce:0.05	767	801		FB		850		291		Cu-304	Cu	[131]
871	10	44.7	39.15		1.5	1.5				Ce:0.15	765	800		FB		850		292		Cu-304	Cu	[131]
872	10	47.63	30.07		1.5	1.5				Ce:0.3	763	798		FB		850		289		Cu-304	Cu	[131]
873	10	47.6	38.96		1.5	1.5				Ce:0.5	760	797		FB		850		289		Cu-304	Cu	[131]
874	10	46.82	38.18		3	1.5				Ce:0.5	746	792		FB		850		288		Cu-304	Cu	[131]
875	10	48.34	40.16		1.5					784	821			FB		850		322		304		[131]

876	10	47.6	39.85		1	1.5				Ce:0.05	773	805			FB		850		362		304		[131]
877	10	47.74	39.21		1.5	1.5				Ce:0.05	767	801			FB		850		366		304		[131]
878	10	44.7	39.15		1.5	1.5				Ce:0.15	765	800			FB		850		375		304		[131]
879	10	47.63	30.07		1.5	1.5				Ce:0.3	763	798			FB		850		362		304		[131]
880	10	47.6	38.96		1.5	1.5				Ce:0.5	760	797			FB		850		336		304		[131]
881	10	46.82	38.18		3	1.5				Ce:0.5	746	792			FB		850		317		304		[131]
882	59.2	23			14.5				3.3		602	687			VB	0.1	740	20	121		316/ZrO ₂		[132]
883	59.2	23			14.5				3.3		602	687			VB	0.1	760	20	293		316/ZrO		[132]
884	59.2	23			14.5				3.3		602	687			VB	0.1	780	20	308		316/ZrO		[132]
885	59.2	23			14.5				3.3		602	687			VB	0.1	800	20	280		316/ZrO		[132]
886	59.2	23			14.5				3.3		602	687			VB	0.1	820	20	275		316/ZrO		[132]
887	59.2	23			14.5				3.3		602	687			VB	0.1	780	10	150		316/ZrO		[132]
888	59.2	23			14.5				3.3		602	687			VB	0.1	780	30	202		316/ZrO		[132]
889	58.2	21.3			17.9				2.6						VB		700	10	185		WC-Co/40Cr		[133]
890	58.2	21.3			17.9				2.6						VB		740	10	241		WC-Co/40Cr		[133]
891	58.2	21.3			17.9				2.6						VB		780	10	198		WC-Co/40Cr		[133]
892		40	1		3						750	802			FB						186		[134]
893		40	1		5										FB						189		[134]
894		40	1		7						700	752			FB						214		[134]

895	37.5	49.5	5						Mn:8	738	808			VB	0.15	835	15	115		MSS/AS S		[135]
896	37.5	49.5	5						Mn:8	738	808			VB	0.15	860	15	133		MSS/AS S		[135]
897	37.5	49.5	5						Mn:8	738	808			VB	0.15	885	15	150		MSS/AS S		[135]
898	37.5	49.5	5						Mn:8	738	808			VB	0.15	910	15	155		MSS/AS S		[135]
899	37.5	49.5	5						Mn:8	738	808			VB	0.15	935	15	147		MSS/AS S		[135]
900	37.5	49.5	5						Mn:8	738	808			VB	0.15	835	15	175		MSS/AS S[Ni]		[135]
901	37.5	49.5	5						Mn:8	738	808			VB	0.15	860	15	205		MSS/AS S[Ni]		[135]
902	37.5	49.5	5						Mn:8	738	808			VB	0.15	885	15	208		MSS/AS S[Ni]		[135]
903	37.5	49.5	5						Mn:8	738	808			VB	0.15	910	15	213		MSS/AS S[Ni]		[135]
904	37.5	49.5	5						Mn:8	738	808			VB	0.15	935	15	195		MSS/AS S[Ni]		[135]
905	37.5	49.5	5						Mn:8	738	808			VB	0.15	910	5	202		MSS/AS S[Ni]		[135]
906	37.5	49.5	5						Mn:8	738	808			VB	0.15	910	10	204		MSS/AS S[Ni]		[135]
907	37.5	49.5	5						Mn:8	738	808			VB	0.15	910	25	195		MSS/AS S[Ni]		[135]
908	37.5	49.5	5						Mn:8	738	808			VB	0.075	910	25	200		MSS/AS S[Ni]		[135]
909	37.5	49.5	5						Mn:8	738	808			VB	0.225	910	25	211		MSS/AS S[Ni]		[135]
910	37.5	49.5	5						Mn:8	738	808			VB	0.3	910	25	185		MSS/AS S[Ni]		[135]

911	37.5	49.5	5						Mn:8	738	808			VB	0.15	910	5	202		MSS/AS S[Ni]		[135]
912	37.5	49.5	5						Mn:8	738	808			VB	0.15	910	10	204		MSS/AS S[Ni]		[135]
913	37.5	49.5	5						Mn:8	738	808			VB	0.15	910	25	195		MSS/AS S[Ni]		[135]
914	37.5	49.5	5						Mn:8	738	808			VB	0.075	910	25	200		MSS/AS S[Ni]		[135]
915	37.5	49.5	5						Mn:8	738	808			VB	0.225	910	25	211		MSS/AS S[Ni]		[135]
916	37.5	49.5	5						Mn:8	738	808			VB	0.3	910	25	185		MSS/AS S[Ni]		[135]
917	72	28							779	779				VB	0.1	850	10	139		Cu/304	ductile-brITTLE	[136]
918	71.8	28					0.2		782	785				VB	0.1	850	10	151		Cu/304	ductile-brITTLE	[136]
919	71.25	28					0.75		787	796				VB	0.1	850	10	157		Cu/304	ductile	[136]
920	70.56	27.44					2		797	829				VB	0.1	850	10	184		Cu/304		[136]
921	72	28							779	779				VB	0.1	850	10	195		Cu/304[Ni]		[136]
922	68.8	25.7						4.5						VB	0.05	870	10	117		YG8/IN 718		[137]
923	68.8	25.7						4.5						VB	0.05	900	10	147		YG8/IN 718		[137]
924	68.8	25.7						4.5						VB	0.05	930	10	169		YG8/IN 718		[137]
925	68.8	25.7						4.5						VB	0.05	960	10	153		YG8/IN 718		[137]
926	35	26	21	18					607	710				VB	0.06	780	5	72.5		WC-8Co/Stee l		[138]

927	35	26	21	18						607	710			VB	0.06	780	10	83		WC-8Co/Stee 1		[138]	
928	35	26	21	18						607	710			VB	0.06	780	15	93.5		WC-8Co/Stee 1		[138]	
929	35	26	21	18						607	710			VB	0.06	780	10	83		WC-8Co/Stee 1		[138]	
930	35	26	21	18						607	710			VB	0.06	780	15	93.5		WC-8Co/Stee 1		[138]	
931	35	26	21	18						607	710			VB	0.16	780	15	84		WC-8Co/Stee 1		[138]	
932	19.1	41.5	38		1.5		1.3			696.9	787.5			FB					325	stainless steel		[139]	
933	20	43	33.5		2.2		1.3							FB					445	stainless steel		[139]	
934	20	42	33.5		3		1.5							FB					450	stainless steel		[139]	
935	19.5	39	36.5		4		1.2			763.9	803.7			FB					129	stainless steel		[139]	
936	73	18			6		Zr:3							VB	0.3	840	15	14.1		Al2O3/C u		[140]	
937	72	18			6		1	Zr:3						VB	0.3	8410	15	18.4		Al2O3/C u		[140]	
938																							
939																							
940	71.5	27					1		Li:0.5	780	820			340	IB	0.05	950	0.5		140.3	TiAl/35 CrMo		[141]
941	71.5	27					1		Li:0.5	780	820			340	IB	0.05	950	1		229.2	TiAl/35		[141]

942	71.5	27						1		Li:0.5	780	820		340	IB	0.05	930	1		324.6	TiAl/35 CrMo		[141]
943	71.5	27						1		Li:0.5	780	820		340	IB	0.05	920	1		321.4	TiAl/35 CrMo		[141]
944	71.5	27						1		Li:0.5	780	820		340	IB	0.05	900	1		159.3	TiAl/35 CrMo		[141]
945	71.5	27						1		Li:0.5	780	820		340	IB	0.05	900	5		154.2	TiAl/35 CrMo		[141]
946	71.5	27						1		Li:0.5	780	820		340	IB	0.05	900	10		131.5	TiAl/35 CrMo		[141]
947	71.5	27						1		Li:0.5	780	820		340	IB	0.05	900	15		111.5	TiAl/35 CrMo		[141]
948	71.5	27						1		Li:0.5	780	820		340	IB	0.05	850	1		151.7	TiAl/35 CrMo		[141]
949	71.5	27						1		Li:0.5	780	820		340	IB	0.05	970	1		186.4	TiAl/35 CrMo		[141]
950	71.5	27						1		Li:0.5	780	820		340	IB	0.05	900	5		154.2	TiAl/35 CrMo		[141]
951	71.5	27						1		Li:0.5	780	820		340	IB	0.05	900	10		131.5	TiAl/35 CrMo		[141]
952	71.5	27						1		Li:0.5	780	820		340	IB	0.05	900	15		111.5	TiAl/35 CrMo		[141]
953	71.5	27						1		Li:0.5	780	820		340	IB	0.05	850	1		151.7	TiAl/35 CrMo		[141]
954	71.5	27						1		Li:0.5	780	820		340	IB	0.05	970	1		186.4	TiAl/35 CrMo		[141]
955	71.5	27						1		Li:0.5	780	820		340	IB	0.05	900	10		131.5	TiAl/35 CrMo		[141]
956	71.5	27						1		Li:0.5	780	820		340	IB	0.05	900	15		111.5	TiAl/35 CrMo		[141]
957	71.5	27						1		Li:0.5	780	820		340	IB	0.05	850	1		151.7	TiAl/35		[141]

958	71.5	27						1		Li:0.5	780	820		340	IB	0.05	970	1	186.4	TiAl/35 CrMo
959	70.2	27.3						2.5								0.1	840	10	16	FeNi42/ SiC
960	68.7	26.8						4.5								0.1	860	10	30	FeNi42/ SiC
961	68.7	26.8						4.5								0.1	880	10	60	FeNi42/ SiC
962	68.7	26.8						4.5								0.1	900	10	35	FeNi42/ SiC
963	68.7	26.8						4.5								0.1	920	10	28	FeNi42/ SiC
964	68.7	26.8						4.5									840	10	37	FeNi42/ SiC
965	68.7	26.8						4.5								0.1	860	10	30	FeNi42/ SiC
966	68.7	26.8						4.5								0.1	880	10	60	FeNi42/ SiC
967	68.7	26.8						4.5								0.1	900	10	35	FeNi42/ SiC
968	68.7	26.8						4.5								0.1	920	10	28	FeNi42/ SiC
969	68.7	26.8						4.5									840	10	37	FeNi42/ SiC
970	68.7	26.8						4.5									860	10	54	FeNi42/ SiC
971	68.7	26.8						4.5									880	10	16	FeNi42/ SiC
972	68.7	26.8						4.5									900	10	10	FeNi42/ SiC
973	68.7	26.8						4.5									920	10	7	FeNi42/

974	70.2	27.3						2.5						0.1	840	10	16		FeNi42/ SiC		[142]
975	68.7	26.8						4.5						0.1	860	10	30		FeNi42/ SiC		[142]
976	68.7	26.8						4.5						0.1	880	10	60		FeNi42/ SiC		[142]
977	68.7	26.8						4.5						0.1	900	10	35		FeNi42/ SiC		[142]
978	68.7	26.8						4.5						0.1	920	10	28		FeNi42/ SiC		[142]
979	68.7	26.8						4.5							840	10	37		FeNi42/ SiC		[142]
980	68.7	26.8						4.5						0.1	860	10	30		FeNi42/ SiC		[142]
981	68.7	26.8						4.5						0.1	880	10	60		FeNi42/ SiC		[142]
982	68.7	26.8						4.5							860	10	54		FeNi42/ SiC		[142]
983	68.7	26.8						4.5							880	10	16		FeNi42/ SiC		[142]

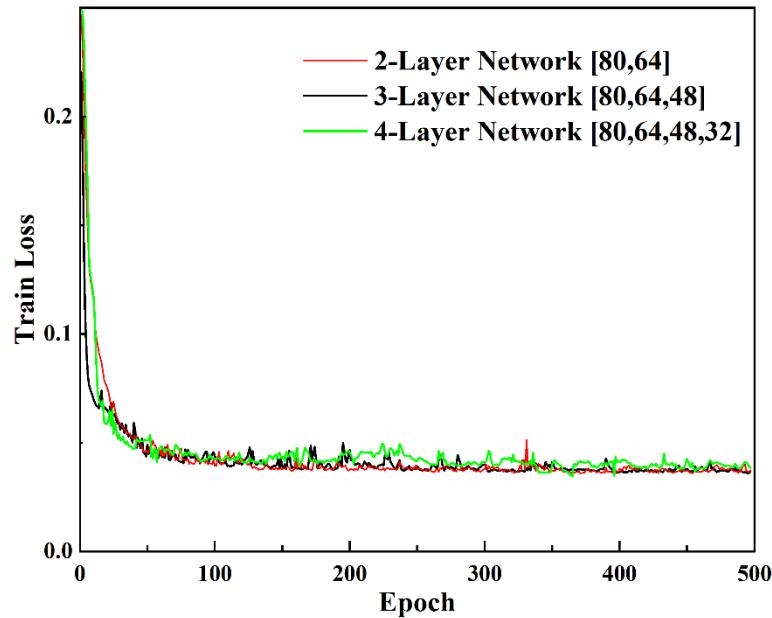


Fig. S1 Network depth impact on training loss

Table S2. Elemental composition of Ag-based alloys selected via GMM screening

Num.	Ag	Cu	Ga	In	Sn	Melting Point (°C)
1	0.461262	0.177046	0.000189	0.318121	0.031707	533.232
2	0.466869	0.175759	0.00024	0.353549	0.018474	532.6492
3	0.499607	0.195334	0.000164	0.238802	0.046538	533.1722
4	0.508808	0.195497	0.000169	0.239274	0.038535	532.6801
5	0.493377	0.185676	0.000202	0.292867	0.023324	533.2378
6	0.51342	0.199363	0.000163	0.225236	0.044124	533.3395
7	0.526011	0.202478	0.000163	0.213267	0.040243	536.5246
8	0.533134	0.204216	0.000162	0.207224	0.037235	535.6048
9	0.53359	0.205443	0.00016	0.202764	0.040544	535.3212
10	0.516838	0.197398	0.00017	0.232455	0.03543	532.6801
11	0.504715	0.190612	0.000224	0.292066	0.017414	532.3398

12	0.504208	0.190521	0.000189	0.267549	0.02647	531.4498
13	0.564421	0.215128	0.000138	0.157413	0.048435	557.9698
14	0.558727	0.21401	0.000142	0.16424	0.048436	557.2384
15	0.558369	0.21095	0.000194	0.212995	0.016729	572.3667
16	0.558118	0.21084	0.000179	0.202748	0.020299	572.3667
17	0.560854	0.212294	0.000158	0.183285	0.027656	569.0959
18	0.561285	0.212522	0.000157	0.181421	0.028424	568.9801
19	0.562244	0.21266	0.000157	0.181343	0.02764	568.9801
20	0.540013	0.205256	0.000168	0.209062	0.029366	537.3203
21	0.528052	0.200752	0.000171	0.223737	0.03057	536.8907
22	0.540869	0.204016	0.000185	0.22483	0.021073	536.6975
23	0.530562	0.201463	0.000172	0.222415	0.029238	535.9693
24	0.540636	0.204624	0.000175	0.215984	0.025089	535.8075
25	0.532894	0.201845	0.000175	0.223995	0.026568	534.4565
26	0.516109	0.196527	0.000174	0.237938	0.032529	532.7626
27	0.513021	0.194366	0.000183	0.252192	0.027305	531.4498
28	0.52966	0.19952	0.000202	0.249291	0.018281	530.0164
29	0.535621	0.202203	0.000217	0.250276	0.01524	529.1508
30	0.463407	0.176159	0.0003	0.37575	0.012148	528.5792
31	0.486127	0.183211	0.000236	0.324244	0.017216	533.2378
32	0.512276	0.204221	0.000155	0.206987	0.064143	533.1353
33	0.517828	0.20722	0.000153	0.197702	0.068528	531.6117
34	0.569712	0.215775	0.000135	0.152671	0.046311	572.3101
35	0.568544	0.21564	0.000135	0.153674	0.046822	567.8046
36	0.568753	0.213583	0.000142	0.16263	0.035629	577.8544
37	0.570609	0.2149	0.000137	0.155491	0.041039	576.0618
38	0.582068	0.217297	0.000129	0.142293	0.041314	587.0964
39	0.573622	0.214613	0.000171	0.186177	0.017767	581.446
40	0.572189	0.214333	0.000183	0.195565	0.015481	579.6889
41	0.566171	0.2135	0.000149	0.171603	0.030683	570.8832
42	0.570235	0.218934	0.000131	0.143211	0.061763	565.2706
43	0.581362	0.216391	0.000148	0.162543	0.02368	594.2302
44	0.585065	0.216809	0.000144	0.156827	0.024395	593.4602

45	0.582149	0.216261	0.000144	0.158631	0.025543	592.0729
46	0.577017	0.214867	0.000138	0.155121	0.033261	579.811
47	0.592844	0.217735	0.000135	0.144761	0.026445	598.173
48	0.585589	0.216383	0.000137	0.149681	0.029173	591.5444
49	0.560058	0.202528	0.000338	0.253323	0.0092	556.0519
50	0.551504	0.209034	0.000217	0.232071	0.013971	541.7077
51	0.604023	0.223971	0.000116	0.112967	0.047096	578.2601
52	0.589964	0.22152	0.000121	0.12636	0.051725	573.7493
53	0.585362	0.22129	0.000123	0.129263	0.055675	573.6793
54	0.594088	0.223374	0.000119	0.118863	0.055148	573.5449
55	0.541504	0.237044	0.155869	0.001346	0.063184	592.0017
56	0.48656	0.164331	0.000349	0.354292	0.010575	529.3806
57	0.484335	0.175148	0.000327	0.346274	0.010879	528.5792
58	0.619855	0.222862	0.000111	0.090431	0.043362	589.0283
59	0.595968	0.224693	0.000119	0.11375	0.059458	567.1918
60	0.58185	0.220898	0.000124	0.132082	0.057803	573.8693
61	0.476219	0.181356	0.0003	0.355179	0.011375	528.4178
62	0.585055	0.221239	0.000163	0.170841	0.016057	594.0376
63	0.481203	0.193869	0.000157	0.240634	0.067465	532.624
64	0.597593	0.225152	0.000142	0.146573	0.018308	599.3513
65	0.599103	0.224224	0.000138	0.143247	0.019643	599.2123
66	0.595904	0.223952	0.000144	0.149294	0.018491	598.4246
67	0.59569	0.225172	0.000146	0.150285	0.017565	599.1946
68	0.589809	0.222167	0.000153	0.160658	0.017438	597.8092
69	0.609036	0.22031	0.000116	0.090293	0.060209	566.256
70	0.606905	0.23082	0.000133	0.131763	0.018118	596.7406
71	0.590489	0.223118	0.000121	0.105209	0.074523	563.3833
72	0.582532	0.223838	0.000123	0.122114	0.070623	560.6344
73	0.568924	0.220425	0.00013	0.139728	0.069593	558.4925
74	0.552629	0.220595	0.000136	0.14716	0.088266	525.6284
75	0.621254	0.226871	0.00011	0.096754	0.033969	597.4072
76	0.595543	0.220707	0.000121	0.092952	0.077151	564.9612
77	0.554366	0.22021	0.000136	0.147447	0.084257	543.9039

78	0.601978	0.200493	0.000401	0.198249	0.006995	598.3316
79	0.572649	0.215331	0.000188	0.19805	0.014476	573.9639
80	0.564813	0.227212	0.000131	0.11955	0.108944	544.7577
81	0.558031	0.224482	0.000133	0.132158	0.102522	543.6276
82	0.496698	0.208991	0.000153	0.191803	0.117373	507.0412
83	0.635262	0.215701	0.005531	0.002701	0.027674	588.8417
84	0.511532	0.216483	0.000153	0.172238	0.127166	509.4161
85	0.441033	0.170703	0.000197	0.351278	0.030584	532.962
86	0.454328	0.17169	0.000271	0.382663	0.015247	532.3792
87	0.636822	0.228936	0.000117	0.056682	0.044968	598.6863
88	0.634563	0.22774	0.00012	0.056704	0.049688	593.1896
89	0.632914	0.226251	0.000116	0.061502	0.047858	588.7066
90	0.571459	0.22647	0.000128	0.115987	0.099254	558.2344
91	0.586441	0.231811	0.000181	0.17354	0.011391	590.136
92	0.58664	0.225562	0.000167	0.169591	0.014212	588.046
93	0.585126	0.224437	0.000169	0.172639	0.014204	587.826
94	0.573329	0.224024	0.000209	0.2016	0.010939	570.0748
95	0.533933	0.220267	0.000144	0.155279	0.111569	513.2178
96	0.618442	0.219035	0.000117	0.072961	0.062201	565.593
97	0.545632	0.223109	0.000138	0.142382	0.111842	543.4592
98	0.612428	0.217808	0.000118	0.076632	0.0673	564.2516
99	0.623568	0.220881	0.000116	0.069063	0.057503	577.3696
100	0.562101	0.226675	0.000133	0.113456	0.120991	541.4462
101	0.546348	0.224978	0.000138	0.134262	0.122972	539.6663
102	0.487093	0.198509	0.000154	0.224554	0.079994	534.7604
103	0.61746	0.220406	0.000129	0.060758	0.07541	564.963
104	0.461831	0.194047	0.000155	0.239137	0.103387	513.0015
105	0.638706	0.228854	0.001585	0.005395	0.072353	597.2873
106	0.507177	0.304927	0.000106	0.063602	0.107541	583.262
107	0.611579	0.219959	0.00014	0.057594	0.091286	545.5719
108	0.522992	0.291501	0.000112	0.061111	0.10819	584.289
109	0.540204	0.280852	0.000119	0.056409	0.10648	583.643
110	0.545498	0.277984	0.000121	0.054939	0.105745	583.643

111	0.604017	0.216861	0.000125	0.073164	0.084843	551.6107
112	0.578763	0.277215	0.000137	0.040009	0.090226	588.9901
113	0.591962	0.26201	0.000147	0.040174	0.093523	588.253
114	0.596974	0.217903	0.000129	0.07471	0.096336	549.4857
115	0.513733	0.21875	0.000154	0.166911	0.134616	513.9568
116	0.601386	0.275498	0.001149	0.005481	0.087567	593.9811
117	0.60187	0.258655	0.000155	0.036939	0.090341	585.055
118	0.436134	0.175456	0.00016	0.293815	0.072867	533.0944
119	0.622954	0.230665	0.000167	0.040919	0.091476	563.8609
120	0.498938	0.308461	0.000105	0.069169	0.110492	583.697
121	0.526857	0.264609	0.00012	0.087721	0.129972	580.546
122	0.621963	0.232554	0.000179	0.038677	0.099061	568.2392
123	0.596916	0.238759	0.000153	0.048172	0.10739	577.5519
124	0.522642	0.282049	0.000113	0.070128	0.115776	584.174
125	0.477795	0.203394	0.000154	0.208444	0.125658	511.8192
126	0.53444	0.261886	0.000121	0.080505	0.126263	575.45
127	0.527967	0.222728	0.000146	0.150362	0.137021	531.6363
128	0.518712	0.221634	0.000152	0.157243	0.144899	513.4558
129	0.500733	0.263028	0.000127	0.121083	0.141034	592.6257
130	0.540266	0.263135	0.00012	0.071147	0.12015	579.734
131	0.532291	0.256916	0.000124	0.09128	0.133726	575.951
132	0.556334	0.252907	0.000126	0.065442	0.118561	572.745
133	0.55664	0.225693	0.00014	0.105359	0.143015	537.158
134	0.493749	0.349849	9.95E-05	0.048156	0.08823	585.511
135	0.5371	0.2246	0.000142	0.139488	0.135179	530.9287
136	0.545061	0.255445	0.000123	0.07489	0.124166	574.763
137	0.563638	0.238039	0.000132	0.074253	0.127708	557.3773
138	0.482524	0.289209	0.129853	0.001904	0.120868	557.708
139	0.54153	0.245159	0.000129	0.095898	0.139119	563.0354
140	0.547739	0.239769	0.000132	0.09414	0.139408	562.904
141	0.539091	0.243834	0.000131	0.101912	0.142808	561.6007
142	0.556907	0.228274	0.000139	0.09686	0.143864	540.8873
143	0.558767	0.225381	0.000139	0.104028	0.139714	540.514

144	0.54556	0.291761	0.004885	0.00333	0.118612	585.8905
145	0.560052	0.278745	0.003902	0.003706	0.119698	591.0246
146	0.548614	0.261493	0.000122	0.064447	0.116102	574.423
147	0.581491	0.220094	0.00014	0.077391	0.126645	549.055
148	0.498065	0.21967	0.000155	0.171451	0.155472	513.2748
149	0.613908	0.211258	0.004147	0.004576	0.121479	532.8243
150	0.590788	0.228879	0.000148	0.058611	0.119457	559.2266
151	0.603006	0.22305	0.000159	0.053674	0.117164	556.0986
152	0.608601	0.22536	0.000165	0.048705	0.111861	557.6716
153	0.598233	0.221891	0.000155	0.058061	0.121269	545.483
154	0.501879	0.230765	0.00015	0.160302	0.15572	534.3518
155	0.502013	0.245685	0.000138	0.141048	0.148825	571.2273
156	0.377736	0.127526	0.000228	0.480069	0.021231	533.612
157	0.422683	0.157526	0.00021	0.391472	0.02621	532.882
158	0.39434	0.138994	0.000209	0.434932	0.025872	532.882
159	0.532328	0.243539	0.000134	0.114311	0.14956	564.9449
160	0.551507	0.22696	0.000141	0.107956	0.150441	537.669
161	0.513193	0.249433	0.000133	0.125856	0.147287	570.8173
162	0.508899	0.249053	0.000134	0.1303	0.147385	570.8173
163	0.5528	0.227836	0.00014	0.104262	0.148167	538.4994
164	0.536549	0.256139	0.000123	0.085862	0.130733	575.725
165	0.498357	0.331887	0.010656	0.002661	0.123094	589.737
166	0.425009	0.151902	0.000333	0.432237	0.012362	529.542
167	0.492545	0.299635	0.00011	0.089425	0.123968	585.893
168	0.568202	0.230621	0.000136	0.077612	0.131758	562.2663
169	0.481126	0.278498	0.000123	0.121267	0.134449	597.955
170	0.480222	0.282016	0.000121	0.118273	0.133064	593.981
171	0.510661	0.243601	0.128594	0.002052	0.155565	532.488
172	0.526023	0.221156	0.128367	0.002147	0.176149	490.0428
173	0.568271	0.261966	0.004153	0.003977	0.133998	585.3795
174	0.616587	0.230173	0.001751	0.006327	0.130029	560.6795
175	0.476304	0.274425	0.000126	0.130381	0.136068	597.185
176	0.519683	0.271572	0.017023	0.00309	0.188649	585.4979

177	0.538693	0.265329	0.01023	0.003313	0.168211	584.4195
178	0.491486	0.362766	0.007701	0.002516	0.096318	590.251
179	0.55492	0.258714	0.006854	0.003646	0.156441	576.6095
180	0.51407	0.251853	0.033632	0.003243	0.252938	572.2198
181	0.525087	0.238599	0.030499	0.003395	0.261527	548.3366
182	0.533437	0.180218	0.116253	0.004232	0.45689	493.7596
183	0.521946	0.208699	0.12305	0.003717	0.394044	490.664
184	0.538825	0.19156	0.112494	0.003491	0.353251	490.2986
185	0.537432	0.196034	0.124949	0.002972	0.30446	483.8156
186	0.566497	0.229408	0.008757	0.004075	0.197543	549.1531
187	0.483186	0.27915	0.126847	0.002322	0.178513	558.3529
188	0.315796	0.096506	0.000177	0.48777	0.069857	543.213
189	0.448515	0.274248	0.000128	0.153036	0.134155	597.742
190	0.468972	0.339632	0.0263	0.00257	0.158863	591.8225
191	0.475111	0.277592	0.109446	0.003178	0.290188	559.5079
192	0.481805	0.270859	0.124169	0.00293	0.261032	556.5779
193	0.445462	0.423415	0.013163	0.002186	0.088158	588.241
194	0.435841	0.409596	0.024303	0.002258	0.115157	594.675
195	0.452951	0.338142	0.055733	0.002672	0.204434	580.9999
196	0.396325	0.196913	0.000138	0.253116	0.114044	513.4562
197	0.425254	0.338311	0.128045	0.002289	0.151678	559.3605
198	0.406824	0.402231	9.27E-05	0.077716	0.097069	586.48
199	0.353449	0.441593	0.082366	0.002129	0.11243	569.211
200	0.424567	0.375441	0.073003	0.002521	0.168796	564.7825

Table.S3 Four components were obtained by cluster analysis.

Alloys	Ag (wt %)	Cu (wt %)	In (wt %)	Sn (wt %)	Ga (wt %)
1	46%-50%	17%-20%	20%-31%	1%-5%	0%
2	55%-65%	17%-23%	9%-15%	3%-9%	0%
3	50%-60%	20%-25%	0%	10%-15%	3%-5%
4	50%-60%	19%-28%	9%-15%	10%-14%	0%

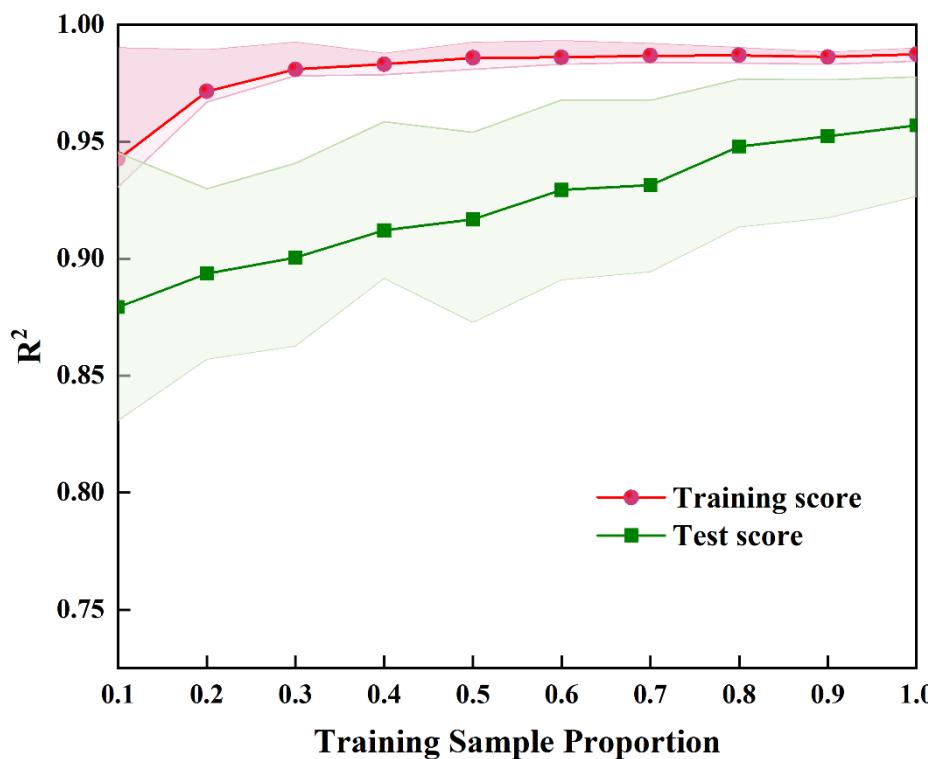


Fig. S2. Learning curves showing model performance (R^2) as a function of training sample proportion.

Table S4. Performance metrics for different clustering methods on generated alloys

Clustering Method	Silhouette Score	Diversity	% in Target Range
GMM	0.71	0.69	54.0
K-means	0.28	0.32	30.4
Binning	-0.16	0.23	47.2

Table S5. Performance comparison of Ensemble, MLP, and GBDT models

Model	MSE	MAE	MAPE	RMAE	R^2

Ensemble model	37.43	27.75	21.00	27.15	0.949
MLP	59.9	34.48	32.31	34.50	0.901
GBDT	66.6	43.92	58.10	42.27	0.909

Table S6. SEM-EDS measured average composition(CA) and nominal composition(CN) of Ag-based solders.

Solders	Ag	Cu	In	Sn	Ga
$\text{Ag}_{49}\text{Cu}_{22}\text{In}_{26}\text{Sn}_3$	49	22	26	3	\
	49.5	23.5	24.3	2.6	\
$\text{Ag}_{65}\text{Cu}_{20}\text{In}_{10}\text{Sn}_5$	65	20	10	5	\
	64.3	21.4	9.0	5.2	\
$\text{Ag}_{55}\text{Cu}_{22}\text{In}_{12}\text{Sn}_{11}$	55	22	12	11	\
	53.3	23.6	10.7	12.4	\
$\text{Ag}_{51}\text{Cu}_{21}\text{Sn}_{18}\text{Ga}_5$	55	25	\	15	5
	50.3	26.5	\	18.3	4.9

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