

Supplementary Material

Табл. S1. Характеристики никеля и легирующих элементов [16].

Table S1. Nickel and the doping elements features [16].

Элемент / Element	C	Cr	Co	Mo	W	Ta	Nb	Al	Ti	Hf	Re	Ru	V	Zr	B	Ni
Атом. масса, а.е.м. Atom weight, a.w.u.	12.0110	51.9961	58.9332	95.9500	183.8400	180.9479	92.9064	26.9815	47.8670	178.4900	186.2070	101.0700	50.9415	91.2240	10.8100	58.6934
Молярный объем, см ³ /моль Molar volume, cm ³ /mol	5.3146	7.2317	6.6200	9.3340	9.5501	10.8677	10.8410	9.9900	10.6210	13.4102	8.8586	8.1706	8.3374	14.0110	4.3943	6.5888
Плотность чистого, г/см ³ Density of pure, g/cm ³	2.2600	7.1900	8.9023	10.2796	19.2501	16.6501	8.5699	2.7009	4.5068	13.3100	21.0200	12.3700	6.1100	6.5109	2.4600	8.9081

Табл. S1. База данных сплавов с указанием содержания и результаты расчетов по разным формулам.

Table S1. The alloys database with content and different equations calculation results.

Название сплава Alloy name	Содержание элементов в сплаве, масс. % Elements content in alloys, wt. %																Реальные значения и расчеты плотности по разным формулам, г/см ³ Real and calculated by different equations density values, g/cm ³			
	C	Cr	Co	Mo	W	Ta	Nb	Al	Ti	Hf	Re	Ru	V	Zr	B	Ni	Реальные значения Real values	Формула (11) Eq. (11)	Формула (8) Eq. (8)	Формула (7) Eq. (7)
AF56(SX792)	0	12	8	2	4	5	0	3.4	4.2	0	0	0	0	0	0	61.4	8.2500	8.4635	8.4188	8.4517
AM1	0	8	6	2	6	9	0	5.2	1.2	0	0	0	0	0	0	62.6	8.5900	8.7035	8.7324	8.6477
AM3	0	8	5.5	2.25	5	3.5	0	6	2	0	0	0	0	0	0	67.75	8.2500	8.2542	8.3050	8.2501
B1900	0.1	8	10	0	0.1	4.3	0.1	6	1	0	0	0	0	0.08	0.015	70.305	8.2200	8.0425	8.0126	8.0965
CM186LC	0.07	6	9	0.5	8	3	0	5.7	0.7	1.4	3	0	0	0	0	62.63	8.7000	8.6676	8.6759	8.7926
CM247LC	0.07	8.1	9.3	0.5	9.5	3	0	5.6	0.7	1.4	0	0	0	0.01	0.015	61.805	8.5300	8.5619	8.5712	8.5863
CMSX10	0	2	3	0.4	5	8	0.1	5.7	0.2	0.15	6	0	0	0	0	69.45	9.0500	8.9837	9.0049	9.1544
CMSX11B	0	12.5	7	0.5	5	5	0.1	3.6	4.2	0.04	0	0	0	0	0	62.06	8.4400	8.4484	8.4169	8.4729
CMSX11C	0	14.9	3	0.4	4.5	5	0.1	3.4	4.2	0.04	0	0	0	0	0	64.46	8.3600	8.4125	8.3918	8.4640
CMSX2	0	8	5	0.8	8	6	0	5.6	1	0	0	0	0	0	0	65.6	8.5600	8.5881	8.6380	8.5651
CMSX3	0	8	5	0.6	8	6	0	5.6	1	0.1	0	0	0	0	0	65.7	8.5600	8.5883	8.6350	8.5719
CMSX4	0	6	9	0.6	6	7	0	5.6	1	0.1	3	0	0	0	0	61.7	8.7000	8.7254	8.7610	8.7990
CMSX6	0	10	5	3	0	2	0	4.8	4.7	0.1	0	0	0	0	0	70.4	7.9800	7.9916	7.9513	8.0440
EPM102	0	2.5	16.5	2	6	8.25	0	5.55	0	0	5.95	3	0	0	0	50.25	9.2000	9.1977	9.1357	9.3951
IN100	0.18	10	15	3	0	0	0	5.5	4.7	0	0	0	1	0.06	0.014	60.546	7.7500	7.7469	7.6906	7.7789
IN713LC	0.11	12	0	4.5	0	0	2	5.9	0.6	0	0	0	0	0.1	0.01	74.78	8.0000	7.9353	7.9642	7.9059
IN738LC	0.09	16	8.5	1.7	2.5	1.7	2	3.5	3.5	0	0	0	0	0.05	0.01	60.45	8.1000	8.1941	8.1603	8.1947
IN792	0.12	12.7	9	2	3.9	3.9	0	3.2	4.2	0	0	0	0	0.1	0.02	60.86	8.2500	8.3828	8.3194	8.3992
M252/J1500	0.15	19	10	0	0	0	0	1	2.6	0	0	0	0	0	0.005	67.245	8.2600	8.2711	8.0672	8.3029
MAR-M200	0.15	9	10	0	12.5	0	1.8	5	2	0	0	0	0	0.05	0.015	59.485	8.5300	8.5060	8.5411	8.5190
MAR-M200Hf	0.13	8	10	0	12	0	0.9	5	2	1.75	0	0	0	0.02	0.015	60.185	8.5000	8.5660	8.5487	8.6238
MAR-M246	0.15	9	10	2.5	10	1.5	0	5.5	1.5	0	0	0	0	0.05	0.015	59.785	8.4400	8.4332	8.4767	8.4158
MAR-M247	0.16	8.5	10	0.65	10	3	0	5.6	1	1.4	0	0	0	0.04	0.015	59.635	8.5400	8.5389	8.5464	8.5821
Mar-M432	0.15	15.5	20	0	3	2	2	2.8	4.3	0	0	0	0	0.05	0.015	50.185	8.1600	8.2445	8.1438	8.2176
MC2	0	8	5	2	8	6	0	6	1.5	0.1	0	0	0	0	0	63.4	8.6300	8.5313	8.6117	8.5010
MC645	0	5	0	0	6	5	0	6	0.5	0.1	4	5	0	0	0	68.4	8.7800	8.7945	8.7837	9.0944

Название сплава Alloy name	C	Cr	Co	Mo	W	Ta	Nb	Al	Ti	Hf	Re	Ru	V	Zr	B	Ni	Реальные значения Real values	Формула (11) Eq. (11)	Формула (8) Eq. (8)	Формула (7) Eq. (7)
MC-NG	0	4	0.2	1	5	5	0	6	0.4	0	4	4	0	0	0	70.4	8.7500	8.7533	8.7526	9.0000
N1 (Виам)	0	2.5	11	2	1.3	8.8	0	5.75	0	0	9	0	0	0	0	59.65	9.0900	9.0140	9.0375	9.2422
N4 (Виам)	0	2.5	6.3	4	4	4.5	0	6	0	0	6	4	0	0	0	62.7	8.8700	8.8967	8.8884	9.1342
N6 (Виам)	0	3	5.5	3.3	4	5.8	0	5.7	0	0	6.3	5	0	0	0	61.4	9.0100	9.0337	8.9896	9.3151
Nasair100	0	9	0	1	10.5	3.3	0	5.75	1.2	0	0	0	0	0	0	69.25	8.5400	8.5407	8.6265	8.5307
PWA1426	0.1	6.5	12	2	6	4	0	6	0	1.5	3	0	0	0.03	0.015	60.7	8.6000	8.6174	8.6366	8.5094
PWA1480	0	10	5	0	4	12	0	5	1.5	0	0	0	0	0	0	62.5	8.7000	8.6847	8.7065	8.6744
PWA1483	0	12.8	9	1.9	3.8	4	0	3.6	4	0	0	0	0	0	0	60.9	8.2000	8.3759	8.3374	8.3630
PWA1484	0	5	10	2	6	9	0	5.6	0	0.1	3	0	0	0	0	59.3	8.9500	8.9259	8.9474	8.9444
PWA1497/MX4	0.03	2	16.5	2	6	8.25	0	5.55	0	0.15	5.95	3	0	0	0.004	50.566	9.2000	9.2018	9.1309	9.4112
Rene N4	0	9	8	2	6	4	0.5	3.7	4.2	0	0	0	0	0	0	62.6	8.5600	8.5262	8.4904	8.5106
Rene N5	0.05	7	8	2	5	7	0	6.2	0	0.15	3	0	0	0	0.004	61.596	8.6400	8.6327	8.7048	8.6885
Rene N6	0.05	4.2	12.5	1.4	6	7.2	0	5.7	0	0.03	5.4	0	0	0	0.004	57.516	8.9700	8.9316	8.9556	9.0565
Rene142	0.12	6.6	12	1.5	4.9	6.4	0	6.2	0	1.5	2.8	0	0	0.03	0.015	57.935	8.6800	8.6168	8.6410	8.7251
RR2000	0	10	15	0	0	0	0	5.5	4	0	0	0	1	0	0	64.5	7.8700	7.7786	7.7195	7.8183
SC-16	0	16	0	3	0	3.5	0	3.5	3.5	0	0	0	0	0	0	70.5	8.2100	8.1874	8.1535	8.2107
SC-180	0	5	10	2	5	8.5	0	5.2	1	0.1	3	0	0	0	0	60.2	8.8400	8.8558	8.8601	8.8903
SC-83(K)	0.002	6.23	0.98	4.34	7.44	7.35	0	5.06	0	0.08	0	0	0	0	0	68.518	8.8600	8.8668	8.8855	8.7488
SRR99	0	8	5	0	10	3	0	5.5	2.2	0	0	0	0	0	0	66.3	8.5600	8.4851	8.5355	8.5063
TMS12	0	6.6	0	0	12.8	7.7	0	5.2	0	0	0	0	0	0	0	67.7	9.0700	9.0465	9.0693	8.9890
TMS138	0	2.9	5.9	2.9	5.9	5.6	0	5.9	0	0.1	4.9	2	0	0	0	63.9	8.8700	8.9228	8.9360	9.0702
TMS162	0	3	5.8	3.9	5.8	5.6	0	5.8	0	0.1	4.9	6	0	0	0	59.1	9.0400	9.0747	9.0171	9.3264
TMS173	0	2.8	5.6	2.8	5.6	5.6	0	5.6	0	0.1	6.9	5	0	0	0	60	8.9600	9.1606	9.1033	9.4620
TMS196	0	4.6	5.6	2.4	5	5.6	0	5.6	0	0.1	6.4	5	0	0	0	59.7	9.0100	9.0558	9.0142	9.3532
TMS6	0	9.2	0	0	8.7	10.4	0	5.3	0	0	0	0	0	0	0	66.4	8.9000	8.8990	8.9434	8.8496
TMS75	0	3	12	2	6	6	0	6	0	0.1	5	0	0	0	0	59.9	8.8900	8.8580	8.8952	8.9569
TMS82+	0	4.9	7.8	1.9	8.7	6	0	5.3	0.5	0.1	2.4	0	0	0	0	62.4	8.9300	8.9056	8.9216	8.9145
ВЖЛ12У	0.17	9.5	14	3.1	1.4	0	0.8	5.3	4.5	0	0	0	0.7	0.02	0.035	60.475	7.9300	7.8571	7.8269	7.8808
ВЖМ4	0	2.5	6	4	4	4.5	0	6	0	0	6	4	0	0	0	63	8.8700	8.8967	8.8890	9.1345
ЖС26	0.13	4.4	8.5	1.1	11.9	0	1.7	5.9	0.9	0	0	0	0.9	0.05	0.015	64.505	8.5700	8.4787	8.5529	8.4659
ЖС30	0.16	7	8.5	0.7	11.8	0	0.9	5.3	1.9	0.8	0	0	0	0	0.015	62.925	8.4000	8.4984	8.5111	8.5370
ЖС30М	0.005	7	7.5	0.6	11.7	0	1.1	5.1	1.8	0.1	0	0	0	0	0	65.095	8.6350	8.5536	8.5822	8.5365
ЖС32	0.15	4.9	9	1	8.5	4	1.6	5.9	0	0	4	0	0	0	0.015	60.935	8.7500	8.7577	8.8197	8.8653
ЖС32М	0.05	4.5	8.5	1.3	5	4.5	0	5.5	0	0	5.5	0	0	0	0	65.15	8.8500	8.7744	8.7949	8.9232
ЖС36	0	4	7	1.6	11.7	0	1.1	5.8	1.1	0	2	0	0	0	0	65.7	8.7200	8.6563	8.7205	8.6766
ЖС40	0	6.3	0.5	4.2	7	7	0.2	5.3	0	0	0	0	0	0	0	69.5	8.8400	8.7844	8.8222	8.6721
ЖС40	0	6.1	0.5	4	6.9	7	0.2	5.6	0	0	0	0	0	0	0	69.7	8.8000	8.7323	8.7854	8.6282
ЖС47	0	2.5	11	2	1.3	8.8	0	5.75	0	0	9.3	0	0	0	0	59.35	9.0900	9.0310	9.0552	9.2682
ЖС6К	0.16	11.3	4.5	4	5	0	0	5.5	2.85	0	0	0	0	0.04	0.02	66.63	8.1600	8.0633	8.0925	8.0926
ЖС6У	0.17	8.8	9.8	1.8	10.3	0	1	5.6	2.4	0	0	0	0	0.04	0.035	60.055	8.4000	8.3111	8.3685	8.3270
ЖС6Ф	0.15	5.5	9.5	1	12	0	1.6	5.5	1.1	1.2	0	0	1	0.08	0.015	61.355	8.4600	8.5514	8.5879	8.5661
ЖСКС1	0.08	13.5	9	2	4	0.3	0.8	4	3.8	0.3	0	0	0	0	0	62.22	8.2000	8.1679	8.1267	8.1847
ЖСКС2	0.01	13	9	1.8	3.8	2	0.4	4	3.7	0	1	0	0	0	0	61.29	8.3200	8.2918	8.2753	8.3186