aluminium

Other names: Aluminum
Inchi: InChI=1S/Al
InchiKey: XAGFODPZIPBFFR-UHFFFAOYSA-N
Formula: Al
SMILES: [Al]
Mol. weight [g/mol]: 26.98
CAS: 7429-90-5

Physical Properties

Property code	Value	Unit	Source
ea	0.43 ± 0.00	eV	NIST Webbook
ea	0.44 ± 0.01	eV	NIST Webbook
hf	330.00 ± 4.00	kJ/mol	NIST Webbook
ie	5.99	eV	NIST Webbook
ie	5.99	eV	NIST Webbook
ie	6.00 ± 0.30	eV	NIST Webbook
ie	5.99	eV	NIST Webbook
ie	6.00	eV	NIST Webbook
ie	6.00 ± 1.00	eV	NIST Webbook
ie	6.60 ± 0.60	eV	NIST Webbook
ie	6.00 ± 0.20	eV	NIST Webbook
ie	5.99 ± 0.00	eV	NIST Webbook
ie	6.00 ± 0.30	eV	NIST Webbook
ie	5.99	eV	NIST Webbook
sgb	164.55 ± 0.00	J/mol×K	NIST Webbook
ss	28.30 ± 0.10	J/mol×K	NIST Webbook
tb	2793.00 ± 4.00	K	NIST Webbook
tf	933.45 ± 0.20	K	NIST Webbook
tf	935.15	K	Thermal behavior of Al/Zr/KClO 4 pyrotechnic compositions at high temperature
tt	933.25 ± 0.20	K	NIST Webbook

Temperature Dependent Properties

Property code	Value	Unit	Temperature [K]	Source
cps	10.51	J/mol×K	84.53	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	0.04	J/mol×K	10.24	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	0.04	J/mol×K	10.71	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	0.05	J/mol×K	11.19	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	0.05	J/mol×K	11.69	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	0.06	J/mol×K	12.21	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	0.07	J/mol×K	12.75	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	0.07	J/mol×K	13.31	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	0.08	J/mol×K	13.90	Low-temperature heat capacity measurements on insulating powders sealed under pressure

cps	0.09	J/mol×K	14.52	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	0.10	J/mol×K	15.16	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	0.11	J/mol×K	15.66	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	0.14	J/mol×K	17.12	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	0.18	J/mol×K	18.70	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	0.24	J/mol×K	20.44	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	0.32	J/mol×K	22.34	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	0.42	J/mol×K	24.42	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	0.57	J/mol×K	26.67	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	0.76	J/mol×K	29.14	Low-temperature heat capacity measurements on insulating powders sealed under pressure

cps	1.02	J/mol×K	31.85	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	1.36	J/mol×K	34.81	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	1.78	J/mol×K	38.05	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	2.32	J/mol×K	41.58	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	2.97	J/mol×K	45.44	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	3.73	J/mol×K	49.66	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	4.62	J/mol×K	54.27	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	5.61	J/mol×K	59.31	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	6.72	J/mol×K	64.81	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	7.91	J/mol×K	70.81	Low-temperature heat capacity measurements on insulating powders sealed under pressure

cps	9.17	J/mol×K	77.38	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	24.14	J/mol×K	299.40	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation
cps	11.83	J/mol×K	92.37	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	13.12	J/mol×K	100.93	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	14.49	J/mol×K	111.01	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	15.74	J/mol×K	121.10	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	16.79	J/mol×K	131.22	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	17.72	J/mol×K	141.30	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	18.54	J/mol×K	151.36	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	19.25	J/mol×K	161.49	Low-temperature heat capacity measurements on insulating powders sealed under pressure

cps	19.88	J/mol×K	171.61	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	20.47	J/mol×K	181.69	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	21.01	J/mol×K	191.79	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	21.48	J/mol×K	201.89	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	21.89	J/mol×K	211.98	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	22.24	J/mol×K	222.08	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	22.58	J/mol×K	232.18	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	22.91	J/mol×K	242.28	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	23.16	J/mol×K	252.36	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	23.41	J/mol×K	262.46	Low-temperature heat capacity measurements on insulating powders sealed under pressure

cps	23.64	J/mol×K	272.56	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	23.88	J/mol×K	282.64	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	24.08	J/mol×K	292.73	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	24.25	J/mol×K	302.81	Low-temperature heat capacity measurements on insulating powders sealed under pressure
cps	0.09	J/mol×K	14.08	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation
cps	0.18	J/mol×K	18.45	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation
cps	0.34	J/mol×K	22.82	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation
cps	0.60	J/mol×K	27.12	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation
cps	0.99	J/mol×K	31.49	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation
cps	1.53	J/mol×K	35.83	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation

cps	2.15	J/mol×K	40.18	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	2.84	J/mol×K	44.52	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	3.64	J/mol×K	48.85	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	4.45	J/mol×K	53.19	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	5.32	J/mol×K	57.52	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	6.18	J/mol×K	61.85	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	7.05	J/mol×K	66.18	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	7.92	J/mol×K	70.51	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	8.77	J/mol×K	74.83	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	9.58	J/mol×K	79.16	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	

cps	10.38	J/mol×K	83.49	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	11.08	J/mol×K	87.82	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	11.77	J/mol×K	92.15	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	12.46	J/mol×K	96.47	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	13.15	J/mol×K	100.70	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	13.74	J/mol×K	105.10	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	14.29	J/mol×K	109.40	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	14.88	J/mol×K	113.70	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	15.37	J/mol×K	118.00	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	15.87	J/mol×K	122.40	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	

cps	16.34	J/mol×K	126.70	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	16.78	J/mol×K	131.00	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	17.22	J/mol×K	135.30	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	17.63	J/mol×K	139.70	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	17.97	J/mol×K	144.00	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	18.36	J/mol×K	148.30	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	18.61	J/mol×K	152.60	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	18.93	J/mol×K	156.90	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	19.21	J/mol×K	161.20	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	19.46	J/mol×K	165.60	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	

cps	19.74	J/mol×K	169.90	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	20.03	J/mol×K	174.20	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	20.29	J/mol×K	178.50	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	20.49	J/mol×K	182.80	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	20.74	J/mol×K	187.10	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	20.96	J/mol×K	191.40	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	21.15	J/mol×K	195.70	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	21.31	J/mol×K	200.10	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	21.47	J/mol×K	204.40	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	21.66	J/mol×K	208.70	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	

cps	21.83	J/mol×K	213.00	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	22.01	J/mol×K	217.30	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	22.20	J/mol×K	221.70	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	22.34	J/mol×K	226.00	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	22.46	J/mol×K	230.30	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	22.58	J/mol×K	234.60	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	22.73	J/mol×K	238.90	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	22.82	J/mol×K	243.30	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	22.99	J/mol×K	247.60	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	23.05	J/mol×K	251.90	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	

cps	23.21	J/mol×K	256.20	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	23.34	J/mol×K	260.50	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	23.48	J/mol×K	264.90	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	23.61	J/mol×K	269.20	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	23.70	J/mol×K	273.50	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	23.73	J/mol×K	277.80	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	23.82	J/mol×K	282.10	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	23.93	J/mol×K	286.40	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	24.02	J/mol×K	290.80	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	
cps	24.12	J/mol×K	295.10	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation	

cps	24.21	J/mol×K	303.80	Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation
rhos	2656.00	kg/m3	298.00	Investigation of thermophysical properties of thin-layered paint

Correlations

Information	Value
Property code	pvap
Equation	ln(Pvp) = A + B/(T + C)
Coeff. A	1.69600e+01
Coeff. B	-3.34448e+04
Coeff. C	-8.09000e+01
Temperature range (K), min.	1482.15
Temperature range (K), max.	2790.81

Sources

Thermal conductivity and interfacial energy of solid Bi solution in the Bi-Al-Zn eutectic system:	https://www.doi.org/10.1016/j.fluid.2010.02.029
Calorimetric measurements of liquid (Al + Li + Zn) alloys:	https://www.doi.org/10.1016/j.jct.2015.09.008
KDB:	https://www.cheric.org/research/kdb/hcprop/showprop.php?cmpid=1945
Aluminum dihydrogen tripolyphosphate: Thermodynamic characteristics:	https://www.doi.org/10.1016/j.jct.2017.03.017
The Yaws Handbook of Vapor Pressure:	https://www.sciencedirect.com/book/9780128029992/the-yaws-handbook-of-vapor-pressure
Thermal conductivities of solid and liquid phases for pure Al, pure Sn and their binary alloys:	https://www.doi.org/10.1016/j.fluid.2010.07.015
Calorimetric Study of AlNd2: Heat capacity; Standard Gibbs Energy of Formation:	https://www.doi.org/10.1016/j.tca.2011.08.025
Variations of thermal conductivity with temperature and composition of Zn in the Bi-[x] at.% Zn-2 at.% Al alloys:	https://www.doi.org/10.1016/j.tca.2012.07.033
Low-temperature heat-capacity measurements on insulating powders sealed under pressure:	https://www.doi.org/10.1016/j.jct.2019.05.009
Investigation of thermophysical properties of thin-layered paint:	https://www.doi.org/10.1016/j.tca.2018.01.022
NIST Webbook:	http://webbook.nist.gov/cgi/cbook.cgi?ID=C7429905&Units=SI
Thermal behavior of Al/Zr/KClO 4 pyrotechnic compositions at high temperature:	https://www.doi.org/10.1016/j.tca.2017.11.006

Legend

cps:	Solid phase heat capacity
ea:	Electron affinity
hf:	Enthalpy of formation at standard conditions
ie:	Ionization energy
pvap:	Vapor pressure
rhos:	Solid Density
sgb:	Molar entropy at standard conditions (1 bar)
ss:	Solid phase molar entropy at standard conditions
tb:	Normal Boiling Point Temperature
tf:	Normal melting (fusion) point
tt:	Triple Point Temperature