

tin

Inchi: InChI=1S/Sn
InchiKey: ATJFFYVFTNAWJD-UHFFFAOYSA-N
Formula: Sn
SMILES: [Sn]
Mol. weight [g/mol]: 118.71
CAS: 7440-31-5

Physical Properties

Property code	Value	Unit	Source
ea	1.15 ± 0.15	eV	NIST Webbook
ea	1.11	eV	NIST Webbook
ea	1.11 ± 0.00	eV	NIST Webbook
ea	1.11 ± 0.02	eV	NIST Webbook
hf	301.20 ± 1.50	kJ/mol	NIST Webbook
hfus	7.13	kJ/mol	Odd even effect in melting properties of 12 alkane-a,x-diamides
ie	7.28 ± 0.07	eV	NIST Webbook
ie	7.34	eV	NIST Webbook
ie	7.34 ± 0.00	eV	NIST Webbook
ie	7.34	eV	NIST Webbook
ie	7.30 ± 0.20	eV	NIST Webbook
ie	7.34	eV	NIST Webbook
ie	7.40 ± 0.30	eV	NIST Webbook
ie	7.87	eV	NIST Webbook
sgb	168.49 ± 0.00	J/molxK	NIST Webbook
ss	51.18 ± 0.08	J/molxK	NIST Webbook
tf	504.87 ± 0.30	K	NIST Webbook
tf	505.11 ± 0.00	K	NIST Webbook
tf	505.15 ± 1.00	K	NIST Webbook

Temperature Dependent Properties

Property code	Value	Unit	Temperature [K]	Source
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dvisc	0.0012530	Paxs	873.00	A Novel Vibrating Finger Viscometer for High-Temperature Measurements in Liquid Metals and Alloys
dvisc	0.0011420	Paxs	973.00	A Novel Vibrating Finger Viscometer for High-Temperature Measurements in Liquid Metals and Alloys
dvisc	0.0010870	Paxs	1073.00	A Novel Vibrating Finger Viscometer for High-Temperature Measurements in Liquid Metals and Alloys
speedsl	2470.00	m/s	608.00	Temperature Dependence of the Velocity of Sound in Liquid Metals of Group XIV
speedsl	2408.00	m/s	804.00	Temperature Dependence of the Velocity of Sound in Liquid Metals of Group XIV
speedsl	2416.00	m/s	814.00	Temperature Dependence of the Velocity of Sound in Liquid Metals of Group XIV
speedsl	2379.00	m/s	919.00	Temperature Dependence of the Velocity of Sound in Liquid Metals of Group XIV
speedsl	2366.00	m/s	1012.00	Temperature Dependence of the Velocity of Sound in Liquid Metals of Group XIV
speedsl	2332.00	m/s	1025.00	Temperature Dependence of the Velocity of Sound in Liquid Metals of Group XIV

speedsl	2306.00	m/s	1218.00	Temperature Dependence of the Velocity of Sound in Liquid Metals of Group XIV
speedsl	2234.00	m/s	1453.00	Temperature Dependence of the Velocity of Sound in Liquid Metals of Group XIV
speedsl	2242.00	m/s	1463.00	Temperature Dependence of the Velocity of Sound in Liquid Metals of Group XIV
tcondl	33.00	W/m×K	603.20	A Novel Instrument for the Measurement of the Thermal Conductivity of Molten Metals. Part II: Measurements
tcondl	32.00	W/m×K	571.20	A Novel Instrument for the Measurement of the Thermal Conductivity of Molten Metals. Part II: Measurements
tcondl	30.70	W/m×K	534.30	A Novel Instrument for the Measurement of the Thermal Conductivity of Molten Metals. Part II: Measurements
tcondl	33.50	W/m×K	630.00	A Novel Instrument for the Measurement of the Thermal Conductivity of Molten Metals. Part II: Measurements
tcondl	34.30	W/m×K	678.20	A Novel Instrument for the Measurement of the Thermal Conductivity of Molten Metals. Part II: Measurements

tcondl	34.50	W/m×K	703.00	A Novel Instrument for the Measurement of the Thermal Conductivity of Molten Metals. Part II: Measurements
tcondl	35.00	W/m×K	730.20	A Novel Instrument for the Measurement of the Thermal Conductivity of Molten Metals. Part II: Measurements
tcondl	27.30	W/m×K	523.10	Repeatability and Refinement of a Transient Hot-wire Instrument for Measuring the Thermal Conductivity of High Temperature Melts
tcondl	28.00	W/m×K	549.20	Repeatability and Refinement of a Transient Hot-wire Instrument for Measuring the Thermal Conductivity of High Temperature Melts
tcondl	28.60	W/m×K	580.00	Repeatability and Refinement of a Transient Hot-wire Instrument for Measuring the Thermal Conductivity of High Temperature Melts
tcondl	29.10	W/m×K	603.70	Repeatability and Refinement of a Transient Hot-wire Instrument for Measuring the Thermal Conductivity of High Temperature Melts

tcondl	30.00	W/m×K	634.90	Repeatability and Refinement of a Transient Hot-wire Instrument for Measuring the Thermal Conductivity of High Temperature Melts
tcondl	30.60	W/m×K	657.00	Repeatability and Refinement of a Transient Hot-wire Instrument for Measuring the Thermal Conductivity of High Temperature Melts
tcondl	31.40	W/m×K	683.80	Repeatability and Refinement of a Transient Hot-wire Instrument for Measuring the Thermal Conductivity of High Temperature Melts
tcondl	31.90	W/m×K	707.60	Repeatability and Refinement of a Transient Hot-wire Instrument for Measuring the Thermal Conductivity of High Temperature Melts
tcondl	32.50	W/m×K	733.20	Repeatability and Refinement of a Transient Hot-wire Instrument for Measuring the Thermal Conductivity of High Temperature Melts

Sources

Thermal conductivities of solid and liquid phases for pure Al, pure Sn and their alloys: <https://www.doi.org/10.1016/j.fluid.2010.07.015>

Measurement of zinc activity in the ternary In Zn Sn alloys by EMF method: NIST Webbook: <https://www.doi.org/10.1016/j.tca.2013.06.039>

Enthalpies of Mixing of Liquid In-Sn and In-Sn-Zn Alloys: <http://webbook.nist.gov/cgi/cbook.cgi?ID=C7440315&Units=SI>

A Novel Instrument for the Measurement of the Thermal Conductivity of Molten Metals: <https://www.doi.org/10.1016/j.tca.2010.02.008>

General enthalpy of mixing of the liquid ternary Au-Cu-Sn system: <https://www.doi.org/10.1007/s10765-006-0057-y>

Repeatability and Refinement of a Transient Hot-wire Instrument for the measurement of properties of Ga-Zn eutectic alloy with Sn additions: <https://www.doi.org/10.1016/j.tca.2008.01.014>

Odd even effect in melting properties of 12 alkane- α,α -diamides: <https://www.doi.org/10.1007/s10765-006-0124-4>

Enthalpies of mixing of liquid Bi Cu and Bi Cu Sn alloys relevant for lead-free soldering: <https://www.doi.org/10.1016/j.fluid.2018.07.008>

Temperature Dependence of the Velocity of Sound in Liquid Metals of Group 2: <https://www.doi.org/10.1016/j.jct.2006.04.004>

Thermodynamic properties of the ZnO-SnO₂ system: <https://www.doi.org/10.1016/j.tca.2008.02.023>

Thermodynamics of uranium in (Ga + Sn) eutectic alloy: <https://www.doi.org/10.1007/s10765-007-0151-9>

Thermodynamic properties of liquid Au-Cu-Sn alloys determined from calorimetric measurements: <https://www.doi.org/10.1016/j.jct.2013.11.010>

The thermodynamic properties of the liquid Ga-Sn-Zn eutectic alloy: <https://www.doi.org/10.1016/j.jct.2015.09.023>

Thermochemistry of Liquid Ni-Sb-Sn Alloys: <https://www.doi.org/10.1016/j.tca.2011.08.011>

Enthalpy of mixing of liquid systems for lead free soldering: The Ni-Sb-Sn system: <https://www.doi.org/10.1016/j.fluid.2018.03.001>

Thermodynamic properties of liquid (antimony + tin) and (gold + antimony + tin) systems: <https://www.doi.org/10.1016/j.tca.2012.02.024>

Thermal conductivities of solid and liquid phases in Pb Cd and Sn Zn binary eutectic alloys: <https://www.doi.org/10.1016/j.tca.2012.01.024>

Binary eutectic alloys for High-Temperature Measurements in Partial Melting Alloys: <https://www.doi.org/10.1016/j.jct.2015.01.010>

Enthalpies of mixing of Ag-Ga-Sn liquid alloys: <https://www.doi.org/10.1016/j.tca.2007.01.009>

Vapor-liquid phase equilibria of binary tin-antimony system in vacuum: <https://www.doi.org/10.1007/s10765-016-2104-7>

Thermodynamic Properties of Liquid Gallium-Sn Eutectic Alloy: <https://www.doi.org/10.1016/j.tca.2011.04.032>

Enthalpies of mixing of liquid systems for lead free soldering: Cu-Sb-Sn system: <https://www.doi.org/10.1016/j.fluid.2016.02.012>

The measurement of thermal conductivity variation with temperature for Sn-20 wt.% In based lead-free ternary solders: <https://www.doi.org/10.1021/je400882q>

<https://www.doi.org/10.1016/j.tca.2010.10.010>

<https://www.doi.org/10.1016/j.tca.2012.12.012>

Legend

dvisc:	Dynamic viscosity
ea:	Electron affinity
hf:	Enthalpy of formation at standard conditions
hfus:	Enthalpy of fusion at standard conditions
ie:	Ionization energy
sgb:	Molar entropy at standard conditions (1 bar)
speedsl:	Speed of sound in fluid
ss:	Solid phase molar entropy at standard conditions
tcondl:	Liquid thermal conductivity
tf:	Normal melting (fusion) point

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