

Threonine

Other names:	(-)-threonine Butanoic acid, 2-amino-3-hydroxy-, [R-(R*,S*)]- D-threonine L-CH ₃ CH(OH)CH(NH ₂)COOH L-Threonine L-«alpha»-Amino-«beta»-hydroxybutyric acid L-Â«alphaÂ»-Amino-Â«betaÂ»-hydroxybutyric acid Threonin Threonine, L- [R-(R*,S*)]-2-amino-3-hydroxybutanoic acid
Inchi:	InChI=1S/C4H9NO3/c1-2(6)3(5)4(7)8/h2-3,6H,5H2,1H3,(H,7,8)/t2-,3+/m0/s1
InchiKey:	AYFVYJQAPQTCCC-STHAYSLISA-N
Formula:	C ₄ H ₉ NO ₃
SMILES:	CC(O)C(N)C(=O)O
Mol. weight [g/mol]:	119.12
CAS:	72-19-5

Physical Properties

Property code	Value	Unit	Source
affp	923.40	kJ/mol	NIST Webbook
affp	922.50	kJ/mol	NIST Webbook
basg	888.50	kJ/mol	NIST Webbook
chs	-2084.60 ± 1.10	kJ/mol	NIST Webbook
chs	-2053.10 ± 0.84	kJ/mol	NIST Webbook
gf	-358.19	kJ/mol	Joback Method
hf	-519.70	kJ/mol	Joback Method
hfs	-776.30 ± 1.10	kJ/mol	NIST Webbook
hfus	14.04	kJ/mol	Joback Method
hvap	74.47	kJ/mol	Joback Method
ie	10.20	eV	NIST Webbook
log10ws	-0.09		Aqueous Solubility Prediction Method
logp	-1.221		Crippen Method
mcvol	90.510	ml/mol	McGowan Method
pc	6084.49	kPa	Joback Method
tb	600.80	K	Joback Method
tc	784.19	K	Joback Method

tf	359.67	K	Joback Method
vc	0.321	m ³ /kmol	Joback Method

Temperature Dependent Properties

Property code	Value	Unit	Temperature [K]	Source
cpg	262.25	J/mol×K	784.19	Joback Method
cpg	228.46	J/mol×K	600.80	Joback Method
cpg	234.89	J/mol×K	631.37	Joback Method
cpg	240.98	J/mol×K	661.93	Joback Method
cpg	246.76	J/mol×K	692.50	Joback Method
cpg	252.22	J/mol×K	723.06	Joback Method
cpg	257.38	J/mol×K	753.63	Joback Method
cps	19.04	J/mol×K	35.00	Thermodynamic properties of L-threonine
cps	2.28	J/mol×K	15.00	Thermodynamic properties of L-threonine
cps	5.35	J/mol×K	20.00	Thermodynamic properties of L-threonine
cps	9.48	J/mol×K	25.00	Thermodynamic properties of L-threonine
cps	14.22	J/mol×K	30.00	Thermodynamic properties of L-threonine
cps	178.76	J/mol×K	360.00	Thermodynamic properties of L-threonine
cps	23.61	J/mol×K	40.00	Thermodynamic properties of L-threonine
cps	28.02	J/mol×K	45.00	Thermodynamic properties of L-threonine
cps	32.34	J/mol×K	50.00	Thermodynamic properties of L-threonine
cps	40.57	J/mol×K	60.00	Thermodynamic properties of L-threonine
cps	48.06	J/mol×K	70.00	Thermodynamic properties of L-threonine
cps	53.55	J/mol×K	80.00	Thermodynamic properties of L-threonine

cps	59.28	J/molxK	90.00	Thermodynamic properties of L-threonine
cps	65.27	J/molxK	100.00	Thermodynamic properties of L-threonine
cps	70.84	J/molxK	110.00	Thermodynamic properties of L-threonine
cps	76.16	J/molxK	120.00	Thermodynamic properties of L-threonine
cps	81.23	J/molxK	130.00	Thermodynamic properties of L-threonine
cps	86.22	J/molxK	140.00	Thermodynamic properties of L-threonine
cps	90.96	J/molxK	150.00	Thermodynamic properties of L-threonine
cps	95.62	J/molxK	160.00	Thermodynamic properties of L-threonine
cps	100.19	J/molxK	170.00	Thermodynamic properties of L-threonine
cps	104.60	J/molxK	180.00	Thermodynamic properties of L-threonine
cps	109.00	J/molxK	190.00	Thermodynamic properties of L-threonine
cps	113.33	J/molxK	200.00	Thermodynamic properties of L-threonine
cps	117.57	J/molxK	210.00	Thermodynamic properties of L-threonine
cps	121.81	J/molxK	220.00	Thermodynamic properties of L-threonine
cps	126.13	J/molxK	230.00	Thermodynamic properties of L-threonine
cps	130.37	J/molxK	240.00	Thermodynamic properties of L-threonine
cps	134.69	J/molxK	250.00	Thermodynamic properties of L-threonine
cps	138.93	J/molxK	260.00	Thermodynamic properties of L-threonine
cps	143.26	J/molxK	270.00	Thermodynamic properties of L-threonine

cps	147.58	J/molxK	280.00	Thermodynamic properties of L-threonine
cps	151.82	J/molxK	290.00	Thermodynamic properties of L-threonine
cps	155.31	J/molxK	298.15	Thermodynamic properties of L-threonine
cps	155.98	J/molxK	300.00	Thermodynamic properties of L-threonine
cps	159.55	J/molxK	310.00	Thermodynamic properties of L-threonine
cps	163.46	J/molxK	320.00	Thermodynamic properties of L-threonine
cps	166.87	J/molxK	330.00	Thermodynamic properties of L-threonine
cps	170.61	J/molxK	340.00	Thermodynamic properties of L-threonine
cps	174.94	J/molxK	350.00	Thermodynamic properties of L-threonine
cps	182.25	J/molxK	370.00	Thermodynamic properties of L-threonine
hvapt	158.00	kJ/mol	439.00	Enthalpy of sublimation of hydroxyl-containing amino acids: Knudsen's effusion mass spectrometric study

Sources

Effect of L-serine and L-threonine on volumetric and acoustic behaviour of aqueous solutions. *Journal of Chemical Thermodynamics*, 1980, 12, 103-110.

Effects of Concentration and Temperature on the Viscosity of Aqueous Solutions of L-Threonine / Glycylglycine + Aqueous Glucose / Aqueous Sucrose Systems. *Journal of Chemical Thermodynamics*, 2013, 45, 103-110.

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Densities and viscosities of amino acid + xylitol + water solutions at 293.15 K and atmospheric pressure:	https://www.doi.org/10.1021/acs.jced.6b00766
Less efficient aqueous solution on the solubility of amino acids in water at 298.15 K:	https://www.doi.org/10.1016/j.jct.2008.09.019
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Solute and solute solvent interactions of L-threonine in aqueous solutions at different temperatures by using volumetric and viscometric methods:	https://www.doi.org/10.1016/j.jct.2013.10.022
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Volumetric and viscometric properties of amino acids in aqueous maltitol solutions at 298.15 K:	https://www.doi.org/10.1016/j.jct.2017.02.024
Volumetric and Viscometric Studies of Amino Acids in Vitamin B6 Aqueous Solutions at Various Temperatures:	https://www.doi.org/10.1021/je500975a https://www.doi.org/10.1016/j.jct.2018.05.008
Molecular interactions of some amino acids in aqueous solutions:	https://www.doi.org/10.1021/je049582g
Studies on the Diffusion Coefficients of Amino Acids in Aqueous Solutions: A Volumetric approach:	https://www.doi.org/10.1016/j.fluid.2007.04.004
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Legend

affp:	Proton affinity
basg:	Gas basicity
chs:	Standard solid enthalpy of combustion
cpg:	Ideal gas heat capacity
cps:	Solid phase heat capacity
gf:	Standard Gibbs free energy of formation
hf:	Enthalpy of formation at standard conditions
hfs:	Solid phase enthalpy of formation at standard conditions
hfus:	Enthalpy of fusion at standard conditions
hvap:	Enthalpy of vaporization at standard conditions
hvapt:	Enthalpy of vaporization at a given temperature
ie:	Ionization energy
log10ws:	Log10 of Water solubility in mol/l
logp:	Octanol/Water partition coefficient
mcvol:	McGowan's characteristic volume
pc:	Critical Pressure

tb: Normal Boiling Point Temperature
tc: Critical Temperature
tf: Normal melting (fusion) point
vc: Critical Volume

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