Lactic acid

Other names:	(.+-.)-lactic acid
	(.+/-.)-Lactic acid
	.alpha.-hydroxypropanoic acid
	.alpha.-hydroxypropionic acid
	1-Hydroxyethane 1-carboxylic acid
	1-Hydroxyethanecarboxylic acid
	2-HYDROXYPROPANOIC ACID
	2-Hydroxypropionic acid
	DL-LACTIC ACID
	Ethylidenelactic acid
	Kyselina 2-hydroxypropanova
	Kyselina mlecna
	Milchsaure
	Milk acid
	NSC 367919
	Ordinary lactic acid
	Propanoic acid, 2-hydroxy-
	Propionic acid, 2-hydroxy-
	Purac FCC 80
	Racemic lactic acid
	Tonsillosan
	biolac
	chem-cast
	«alpha»-Hydroxypropanoic acid
	«alpha»-Hydroxypropionic acid
	Â«alphaÂ»-Hydroxypropanoic acid
	Â«alphaÂ»-Hydroxypropionic acid
Inchi:	InChI=1S/C3H6O3/c1-2(4)3(5)6/h2,4H,1H3,(H,5,6)
InchiKey:	JVTAAEKCZFNVCJ-UHFFFAOYSA-N
Formula:	C3H6O3
SMILES:	CC(O)C(=O)O
Mol. weight [g/mol]:	90.08
CAS:	50-21-5

Physical Properties

Property code	Value	Unit	Source

chs	-1362.80	kJ/mol	NIST Webbook
gf	-430.62	kJ/mol	Joback Method
hf	-527.57	kJ/mol	Joback Method
hfus	9.78	kJ/mol	Joback Method
hvap	61.99	kJ/mol	Joback Method
log10ws	0.45		Crippen Method
logp	-0.548		Crippen Method
mcvol	66.440	ml/mol	McGowan Method
pc	6389.77	kPa	Joback Method
rinpol	838.00		NIST Webbook
rinpol	838.00		NIST Webbook
tb	398.20	K	Liquid-liquid equilibria of water + lactic acid + methyl isobutyl ketone
tc	677.91	K	Joback Method
tf	290.00	K	The phase envelopes of alternative solvents (ionic liquid, CO2) and building blocks of biomass origin (lactic acid, propionic acid)
tf	290.00 ± 2.00	K	NIST Webbook
tt	290.00 ± 0.20	K	NIST Webbook
vc	0.241	m3/kmol	Joback Method

Temperature Dependent Properties

Property code	Value	Unit	Temperature [K]	Source
cpg	165.34	J/mol×K	649.23	Joback Method
cpg	152.52	J/mol×K	563.19	Joback Method
cpg	147.84	J/mol×K	534.51	Joback Method
cpg	142.95	J/mol×K	505.83	Joback Method
cpg	156.99	J/mol×K	591.87	Joback Method
cpg	169.22	J/mol×K	677.91	Joback Method
cpg	161.26	J/mol×K	620.55	Joback Method
dvisc	0.1012311	Pa×s	280.14	Joback Method
dvisc	0.0001047	Pa×s	505.83	Joback Method
dvisc	0.0002078	Pa×s	468.22	Joback Method
dvisc	0.0004648	Pa×s	430.60	Joback Method
dvisc	0.0012133	Pa×s	392.99	Joback Method
dvisc	0.0038800	Pa×s	355.37	Joback Method
dvisc	0.0163392	Pa×s	317.75	Joback Method
hfust	11.34	kJ/mol	289.90	NIST Webbook

rfi	1.43940		293.15	(Liquid + liquid) equilibria of (water + lactic acid + alcohol) ternary systems
rhol	1202.57	kg/m3	298.15	Extraction of Carboxylic Acids from Aqueous Solutions by Using [BMim][NTf2] and Salting-out Agents
rhol	1199.91	kg/m3	298.20	Liquid-liquid equilibrium data for ternary systems of water + lactic acid + C4-C7 alcohols at 298.2 K and atmospheric pressure

Correlations

Information	Value
Property code	pvap
Equation	ln(Pvp) = A + B/(T + C)
Coeff. A	1.23768e+01
Coeff. B	-3.48122e+03
Coeff. C	-9.15110e+01
Temperature range (K), min.	379.47
Temperature range (K), max.	584.23

Information	Value
Property code	pvap
Equation	ln(Pvp) = A + B/T + C*ln(T) + D*T^2
Coeff. A	1.15361e+02
Coeff. B	-1.18844e+04
Coeff. C	-1.41753e+01
Coeff. D	1.00178e-05
Temperature range (K), min.	291.15
Temperature range (K), max.	616.00

Sources

McGowan Method:	http://link.springer.com/article/10.1007/BF02311772
Comparison of the Efficiencies of Amine Extractants on Lactic Acid with Different Organic Solvents:	https://www.doi.org/10.1021/je900446d
Crippen Method:	https://www.chemeo.com/doc/models/crippen_log10ws
Liquid-liquid equilibrium data for ternary systems of water + lactic acid + C4-C7 alcohols at 298.2 K and atmospheric pressure:	https://www.doi.org/10.1016/j.fluid.2013.06.007
Crippen Method:	http://pubs.acs.org/doi/abs/10.1021/ci990307l
Physical properties of seven deep eutectic solvents based on L-proline or betaine:	https://www.doi.org/10.1016/j.jct.2018.12.017
A new low transition temperature mixture (LTTM) formed by choline chloride + lactic acid: Characterization as solvent for CO2 capture:	https://www.doi.org/10.1016/j.fluid.2012.12.001
Joback Method:	https://en.wikipedia.org/wiki/Joback_method
Acoustic, volumetric, transport, optical and rheological properties of benzyltripropylammonium based Deep Eutectic Solvents:	https://www.doi.org/10.1016/j.fluid.2017.03.011
Synthesis and Physical and Thermodynamic Properties of Lactic Acid and Malic Acid-Based Natural Deep Eutectic Solvents:	https://www.doi.org/10.1021/acs.jced.7b01037
KDB Vapor Pressure Data:	https://www.cheric.org/research/kdb/hcprop/showprop.php?cmpid=973
KDB:	https://www.cheric.org/research/kdb/hcprop/showprop.php?cmpid=973
Extraction of Carboxylic Acids from Aqueous Solutions by Using [Bmim][Tf2] and Salting-out Agents:	https://www.doi.org/10.1021/acs.jced.9b00041
Vapor-Liquid Equilibria of the Mixtures Involved in the Esterification of Lactic Acid with Methanol:	https://www.doi.org/10.1021/je034028c
Specific Heat Capacities of Two Functional Ionic Liquids and Two Functional Deep Eutectic Solvents for the Absorption of SO2:	https://www.doi.org/10.1021/acs.jced.7b00102
The Yaws Handbook of Vapor Pressure:	https://www.sciencedirect.com/book/9780128029992/the-yaws-handbook-of-vapor-pressure
Liquid-liquid equilibria of water + lactic acid + methyl isobutyl ketone:	https://www.doi.org/10.1016/j.fluid.2014.06.010
The phase envelopes of alternative solvents (ionic liquid, CO2) and building blocks of biomass origin (Levulinic acid, phenolic acid):	https://www.doi.org/10.1016/j.fluid.2010.05.013
(Liquid+liquid) equilibria of (water + lactic acid + alcohol) ternary systems:	https://www.doi.org/10.1016/j.jct.2008.07.014
NIST Webbook:	http://webbook.nist.gov/cgi/cbook.cgi?ID=C50215&Units=SI

Legend

chs:	Standard solid enthalpy of combustion
cpg:	Ideal gas heat capacity
dvisc:	Dynamic viscosity
gf:	Standard Gibbs free energy of formation
hf:	Enthalpy of formation at standard conditions
hfus:	Enthalpy of fusion at standard conditions
hfust:	Enthalpy of fusion at a given temperature
hvap:	Enthalpy of vaporization at standard conditions
log10ws:	Log10 of Water solubility in mol/l
logp:	Octanol/Water partition coefficient
mcvol:	McGowan's characteristic volume
pc:	Critical Pressure
pvap:	Vapor pressure
rfi:	Refractive Index

rhol:	Liquid Density
rinpol:	Non-polar retention indices
tb:	Normal Boiling Point Temperature
tc:	Critical Temperature
tf:	Normal melting (fusion) point
tt:	Triple Point Temperature
vc:	Critical Volume