Dodecanoic acid

Other names:	1-Undecanecarboxylic acid
	ABL
	Acide Laurique
	Aliphat no. 4
	C-1297
	Dodecanoic (Lauric) acid
	Dodecoic acid
	Dodecylic acid
	Duodecylic acid
	Emery 650
	Emery 651
	Hydrofol acid 1255
	Hydrofol acid 1295
	Hystrene 9512
	Lauric acid
	Lauric acid (dodecanoic acid)
	Laurostearic acid
	Lunac L 70
	N-LAURIC ACID
	Neo-fat 12
	Neo-fat 12-43
	Ninol aa62 extra
	Philacid 1200
	Prifrac 2920
	Undecane-1-carboxylic acid
	Univol U-314
	Vulvic acid
	Wecoline 1295
	dodecanoic acid (lauric acid)
	n-Dodecanoic acid
Inchi:	InChI=1S/C12H24O2/c1-2-3-4-5-6-7-8-9-10-11-12(13)14/h2-11H2,1H3,(H,13,14)
InchiKey:	POULHZVOKOAJMA-UHFFFAOYSA-N
Formula:	C12H24O2
SMILES:	CCCCCCCCCCCC(=O)O
Mol. weight [g/mol]:	200.32
CAS:	143-07-7

Physical Properties

Property code	Value	Unit	Source
chl	-7377.00 ± 0.90	kJ/mol	NIST Webbook
chs	-7423.70 ± 7.50	kJ/mol	NIST Webbook
gf	-215.58	kJ/mol	Joback Method
hf	-555.82	kJ/mol	Joback Method
hfus	35.60	kJ/mol	Solid-Liquid Equilibrium of Binary Systems Containing Fatty Acids and Fatty Alcohols Using Differential Scanning Calorimetry
hsub	117.20 ± 2.90	kJ/mol	NIST Webbook
hsub	133.00 ± 2.00	kJ/mol	NIST Webbook
hsub	127.90	kJ/mol	NIST Webbook
hsub	147.00 ± 4.00	kJ/mol	NIST Webbook
hvap	65.73	kJ/mol	Joback Method
log10ws	-4.62		Aqueous Solubility Prediction Method
logp	3.992		Crippen Method
mcvol	187.380	ml/mol	McGowan Method
pc	1867.79 ± 85.00	kPa	NIST Webbook
rinpol	1578.00		NIST Webbook
rinpol	1576.00		NIST Webbook
rinpol	1568.00		NIST Webbook
rinpol	1571.00		NIST Webbook
rinpol	1577.00		NIST Webbook
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ripol	2524.00		NIST Webbook
ripol	2446.00		NIST Webbook
ripol	2503.00		NIST Webbook
tb	571.00 ± 3.00	K	NIST Webbook
tc	743.43 ± 3.00	K	NIST Webbook
tf	317.70	K	Study of the Effect of Pressure on Melting Behavior of Saturated Fatty Acids in Liquid or Supercritical Carbon Dioxide
tf	317.40	K	Solid Liquid Equilibria in the Binary Systems of Saturated Fatty Acids or Triglycerides (C12 to C18) + Hexadecane
tf	316.75	K	Prediction of the properties of eutectic fatty acid phase change materials
tf	316.94	K	Solid-Liquid Equilibrium of Binary Fatty Acid Mixtures
tf	317.00	K	Aqueous Solubility Prediction Method
tf	316.18	K	High pressure solid liquid equilibria of fatty acids
tf	317.48	K	Measurement and PC-SAFT modeling of solid-liquid equilibrium of deep eutectic solvents of quaternary ammonium chlorides and carboxylic acids
tf	318.50	K	Solid-liquid phase equilibrium diagrams of binary mixtures containing fatty acids, fatty alcohol compounds and tripalmitin using differential scanning calorimetry
tf	318.07	K	The solid liquid phase diagrams of binary mixtures of even saturated fatty acids differing by six carbon atoms

tf	315.95	K	Thermal conductivity enhancement of lauric acid phase change nanocomposite in solid and liquid state with single-walled carbon nanohorn inclusions
tf	315.85	K	Improving thermal properties of shape-stabilized phase change materials containing lauric acid and mesocellular foam silica by assessing thermodynamic properties of the non-melting layer
tt	317.71	K	Solubility Measurement of Lauric, Palmitic, and Stearic Acids in Ethanol, n-Propanol, and 2-Propanol Using Differential Scanning Calorimetry
tt	320.35	K	Fabrication of shape-stable composite phase change materials based on lauric acid and graphene/graphene oxide complex aerogels for enhancement of thermal energy storage and electrical conduction
tt	316.98 ± 0.02	K	NIST Webbook
vc	0.733	m3/kmol	Joback Method

Temperature Dependent Properties

Property code	Value	Unit	Temperature [K]	Source
cpg	576.84	J/mol×K	786.00	Joback Method
cpg	516.54	J/mol×K	647.67	Joback Method
cpg	529.70	J/mol×K	675.34	Joback Method
cpg	542.30	J/mol×K	703.00	Joback Method
cpg	554.35	J/mol×K	730.67	Joback Method
cpg	565.85	J/mol×K	758.33	Joback Method
cpg	502.78	J/mol×K	620.01	Joback Method
cps	381.00	J/mol×K	279.00	NIST Webbook
cps	428.90	J/mol×K	301.00	NIST Webbook
cps	404.28	J/mol×K	298.15	NIST Webbook
dvisc	0.0076488	Pa×s	335.75	Joback Method
dvisc	0.0008201	Pa×s	430.50	Joback Method
dvisc	0.0003743	Pa×s	477.88	Joback Method

dvisc	0.0001968	Pa×s	525.26	Joback Method
dvisc	0.0001151	Pa×s	572.63	Joback Method
dvisc	0.0000730	Pa×s	620.01	Joback Method
dvisc	0.0021816	Pa×s	383.13	Joback Method
hfust	36.65	kJ/mol	316.90	NIST Webbook
hfust	36.65	kJ/mol	316.90	NIST Webbook
hfust	36.65	kJ/mol	316.90	NIST Webbook
hfust	34.70	kJ/mol	317.90	NIST Webbook
hfust	36.10	kJ/mol	316.60	NIST Webbook
hfust	44.94	kJ/mol	327.00	NIST Webbook
hsubt	132.60	kJ/mol	300.50	NIST Webbook
hsubt	140.20 ± 3.30	kJ/mol	305.00	NIST Webbook
hsubt	140.00 ± 3.00	kJ/mol	295.70	NIST Webbook
hsubt	117.20 ± 2.90	kJ/mol	303.00	NIST Webbook
hvapt	95.80	kJ/mol	331.00	NIST Webbook
hvapt	81.30	kJ/mol	437.00	NIST Webbook
hvapt	88.80	kJ/mol	483.00	NIST Webbook
pvap	8.00	kPa	484.80	Vapor pressure data for fatty acids obtained using an adaptation of the DSC technique
pvap	6.67	kPa	479.60	Vapor pressure data for fatty acids obtained using an adaptation of the DSC technique
pvap	1.33	kPa	444.60	Vapor pressure data for fatty acids obtained using an adaptation of the DSC technique
pvap	2.67	kPa	458.90	Vapor pressure data for fatty acids obtained using an adaptation of the DSC technique
pvap	4.00	kPa	468.50	Vapor pressure data for fatty acids obtained using an adaptation of the DSC technique
pvap	5.33	kPa	475.00	Vapor pressure data for fatty acids obtained using an adaptation of the DSC technique

pvap	9.33	kPa	490.50	Vapor pressure data for fatty acids obtained using an adaptation of the DSC technique
rhol	838.90	kg/m3	368.20	Density, Viscosity, and Thermal Conductivity of Eight Carboxylic Acids from (290.3 to 473.4) K
rhol	762.00	kg/m3	467.20	Density, Viscosity, and Thermal Conductivity of Eight Carboxylic Acids from (290.3 to 473.4) K
rhol	872.40	kg/m3	322.10	Density, Viscosity, and Thermal Conductivity of Eight Carboxylic Acids from (290.3 to 473.4) K
rhol	864.60	kg/m3	332.10	Density, Viscosity, and Thermal Conductivity of Eight Carboxylic Acids from (290.3 to 473.4) K
rhol	849.90	kg/m3	352.10	Density, Viscosity, and Thermal Conductivity of Eight Carboxylic Acids from (290.3 to 473.4) K
rhol	770.20	kg/m3	457.20	Density, Viscosity, and Thermal Conductivity of Eight Carboxylic Acids from (290.3 to 473.4) K
rhol	824.10	kg/m3	388.40	Density, Viscosity, and Thermal Conductivity of Eight Carboxylic Acids from (290.3 to 473.4) K
rhol	809.30	kg/m3	408.10	Density, Viscosity, and Thermal Conductivity of Eight Carboxylic Acids from (290.3 to 473.4) K

rhol	794.40	kg/m3	428.10	Density, Viscosity, and Thermal Conductivity of Eight Carboxylic Acids from (290.3 to 473.4) K
rhol	783.50	kg/m3	442.20	Density, Viscosity, and Thermal Conductivity of Eight Carboxylic Acids from (290.3 to 473.4) K
sfust	115.70	J/mol×K	316.90	NIST Webbook
sfust	137.00	J/mol×K	327.00	NIST Webbook

Pressure Dependent Properties

Property code	Value	Unit	Pressure [kPa]	Source
tbp	465.77	K	3.42	Vapor-liquid equilibria of monoacylglicerol + monoacylglicerol or alcohol or fatty acid at subatmospheric pressures
tbrp	498.20	K	13.30	NIST Webbook

Correlations

Information	Value
Property code	pvap
Equation	ln(Pvp) = A + B/(T + C)
Coeff. A	1.58098e+01
Coeff. B	-5.26917e+03
Coeff. C	-1.00180e+02
Temperature range (K), min.	439.64
Temperature range (K), max.	602.09

Information	Value
Property code	pvap

Equation	ln(Pvp) = A + B/T + C*ln(T) + D*T^2
Coeff. A	2.90782e+02
Coeff. B	-2.44556e+04
Coeff. C	-3.91170e+01
Coeff. D	1.51519e-05
Temperature range (K), min.	317.15
Temperature range (K), max.	734.00

Sources

Vapor pressure data for fatty acids obtained using an adaptation of the DSC technique:	https://www.doi.org/10.1016/j.tca.2012.07.034
Physical properties of systems of interest to the edible oil industry: Viscosities and densities of model systems formed by (triacylglycerol + fatty acid + solvent):	https://www.doi.org/10.1016/j.jct.2017.06.012
KDB Vapor Pressure Data:	https://www.cheric.org/research/kdb/hcprop/showprop.php?cmpid=946
McGowan Method:	http://link.springer.com/article/10.1007/BF02311772
Apparent Molar Volumes and Viscosities of Lauric, Palmitic, and Stearic Acids in 2-Butanol at (20, 30, 40, and 60) °C:	https://www.doi.org/10.1021/je025538u
Solubilities of Dodecanoic and Tetradecanoic Acids in Supercritical CO2 with and without Entrainers:	https://www.doi.org/10.1021/je800544a
Twenty Years of Experimental Determinations of Thermophysical Properties with High Accuracy: Thermodynamics Laboratory, ESIQIE-IPN, Mexico:	https://www.doi.org/10.1021/acs.jced.8b01027
Fabrication of shape-stable composite phase change materials based on lauric acid and graphene/graphene oxide complex aerogels for enhancement of thermal energy storage and electrical conduction:	https://www.doi.org/10.1016/j.tca.2018.04.002
The Yaws Handbook of Vapor Pressure:	https://www.sciencedirect.com/book/9780128029992/the-yaws-handbook-of-vapor-pressure
Determination and Correlation of Solubilities of Lauric Acid in Eight Alcohols:	https://www.doi.org/10.1021/je500222s
Phase behavior of (CO2 + methanol + lauric acid) system:	https://www.doi.org/10.1016/j.jct.2011.02.017
Solubility Measurement of Lauric, Palmitic, and Stearic Acids in Ethanol, n-Propanol, and 2-Propanol Using Differential Scanning Calorimetry:	https://www.doi.org/10.1021/acs.jced.8b01044
NIST Webbook:	http://webbook.nist.gov/cgi/cbook.cgi?ID=C143077&Units=SI
Activity coefficient at infinite dilution measurements for organic solutes (polar and non-polar) in fatty compounds: Saturated fatty acids:	https://www.doi.org/10.1016/j.jct.2012.06.009
Phase Equilibria of Long-Chain Carboxylic Acids in Supercritical Propane:	https://www.doi.org/10.1021/je101077v
Study of the Effect of Pressure on Melting Behavior of Saturated Fatty Acids in Liquid or Supercritical Carbon Dioxide:	https://www.doi.org/10.1021/je400260c
The solid-liquid phase diagrams of binary mixtures of even saturated fatty acids differing by six carbon atoms:	https://www.doi.org/10.1016/j.tca.2009.06.018
Thermodynamic properties of hydrophobic deep eutectic solvents and solubility of water and HMF in them: Measurements and PC-SAFT modeling:	https://www.doi.org/10.1016/j.fluid.2019.02.010
Solid-Liquid Equilibrium of Binary Fatty Acid Mixtures:	https://www.doi.org/10.1021/je060146z
Joback Method:	https://en.wikipedia.org/wiki/Joback_method
Thermal conductivity enhancement of lauric acid phase change nanocomposite in solid and liquid state with single-walled carbon nanohorn inclusions:	https://www.doi.org/10.1016/j.tca.2014.12.004
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Legend

chl:	Standard liquid enthalpy of combustion
chs:	Standard solid enthalpy of combustion
cpg:	Ideal gas heat capacity
cps:	Solid phase 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
hsub:	Enthalpy of sublimation at standard conditions
hsubt:	Enthalpy of sublimation at a given temperature
hvap:	Enthalpy of vaporization at standard conditions
hvapt:	Enthalpy of vaporization at a given temperature
log10ws:	Log10 of Water solubility in mol/l
logp:	Octanol/Water partition coefficient
mcvol:	McGowan's characteristic volume
pc:	Critical Pressure
pvap:	Vapor pressure
rhol:	Liquid Density
rinpol:	Non-polar retention indices
ripol:	Polar retention indices
sfust:	Entropy of fusion at a given temperature
tb:	Normal Boiling Point Temperature
tbp:	Boiling point at given pressure
tbrp:	Boiling point at reduced pressure
tc:	Critical Temperature
tf:	Normal melting (fusion) point
tt:	Triple Point Temperature
vc:	Critical Volume