Naphthalene, decahydro-, cis-

Other names:	(Z)-Decahydronaphthalene
	Decahydronaphthalene, (Z)-
	Decahydronaphthalene, cis
	c-Decahydronaphthalene
	c-Decalin
	cis-Decahydronapthalene
	cis-bicyclo[4.4.0]decane
	cis-decahydronaphthalene
	cis-decalin
	cis-perhydronaphthalene
Inchi:	InChI=1S/C10H18/c1-2-6-10-8-4-3-7-9(10)5-1/h9-10H,1-8H2/t9-,10+
InchiKey:	NNBZCPXTIHJBJL-AOOOYVTPSA-N
Formula:	C10H18
SMILES:	C1CCC2CCCCC2C1
Mol. weight [g/mol]:	138.25
CAS:	493-01-6

Physical Properties

Property code	Value	Unit	Source
chl	-6275.60	kJ/mol	NIST Webbook
chl	-6280.90 ± 4.10	kJ/mol	NIST Webbook
chl	-6288.22 ± 0.92	kJ/mol	NIST Webbook
chl	-6287.70 ± 1.30	kJ/mol	NIST Webbook
gf	106.42	kJ/mol	Joback Method
hf	-169.20 ± 2.30	kJ/mol	NIST Webbook
hf	-169.60	kJ/mol	NIST Webbook
hfl	-219.50 ± 0.92	kJ/mol	NIST Webbook
hfl	-219.90 ± 1.30	kJ/mol	NIST Webbook
hfus	9.53	kJ/mol	Joback Method
hsub	62.50	kJ/mol	NIST Webbook
hvap	50.30	kJ/mol	NIST Webbook
hvap	50.20 ± 2.10	kJ/mol	NIST Webbook
ie	9.32 ± 0.05	eV	NIST Webbook
ie	9.43 ± 0.00	eV	NIST Webbook
ie	9.32 ± 0.05	eV	NIST Webbook
ie	9.40	eV	NIST Webbook
log10ws	-3.31		Crippen Method

logp	3.367		Crippen Method
mcvol	130.040	ml/mol	McGowan Method
pc	2490.00 ± 50.00	kPa	NIST Webbook
pc	3200.00 ± 200.00	kPa	NIST Webbook
pc	3207.00 ± 20.68	kPa	NIST Webbook
rinpol	1116.00		NIST Webbook
rinpol	1137.70		NIST Webbook
rinpol	1096.00		NIST Webbook
rinpol	1097.00		NIST Webbook
rinpol	1124.00		NIST Webbook
rinpol	1119.00		NIST Webbook
rinpol	1089.00		NIST Webbook
rinpol	1092.00		NIST Webbook
rinpol	1096.10		NIST Webbook
rinpol	1089.50		NIST Webbook
rinpol	1092.00		NIST Webbook
rinpol	1082.00		NIST Webbook
rinpol	1097.00		NIST Webbook
rinpol	1099.00		NIST Webbook
rinpol	1103.00		NIST Webbook
rinpol	1097.00		NIST Webbook
rinpol	1093.00		NIST Webbook
rinpol	1089.00		NIST Webbook
rinpol	1124.00		NIST Webbook
rinpol	1119.00		NIST Webbook
rinpol	1101.00		NIST Webbook
rinpol	1123.00		NIST Webbook
rinpol	1113.00		NIST Webbook
rinpol	1096.00		NIST Webbook
rinpol	1096.00		NIST Webbook
rinpol	1109.00		NIST Webbook
rinpol	1130.00		NIST Webbook
rinpol	1097.00		NIST Webbook
rinpol	1097.00		NIST Webbook
rinpol	1102.00		NIST Webbook
rinpol	1090.00		NIST Webbook
rinpol	1081.50		NIST Webbook
rinpol	1120.00		NIST Webbook
rinpol	1132.00		NIST Webbook
rinpol	1087.00		NIST Webbook
rinpol	1101.40		NIST Webbook
rinpol	1106.20		NIST Webbook
rinpol	1124.80		NIST Webbook
rinpol	1137.70		NIST Webbook

rinpol	1101.40		NIST Webbook
rinpol	1106.20		NIST Webbook
rinpol	1100.00		NIST Webbook
rinpol	1114.00		NIST Webbook
rinpol	1119.00		NIST Webbook
rinpol	1106.00		NIST Webbook
rinpol	1085.00		NIST Webbook
rinpol	1089.50		NIST Webbook
rinpol	1096.10		NIST Webbook
rinpol	1100.40		NIST Webbook
rinpol	1071.60		NIST Webbook
rinpol	1089.50		NIST Webbook
rinpol	1096.10		NIST Webbook
rinpol	1100.40		NIST Webbook
rinpol	1090.00		NIST Webbook
rinpol	1078.85		NIST Webbook
rinpol	1086.83		NIST Webbook
rinpol	1092.00		NIST Webbook
rinpol	1092.50		NIST Webbook
rinpol	1101.09		NIST Webbook
rinpol	1107.06		NIST Webbook
rinpol	1085.00		NIST Webbook
rinpol	1132.00		NIST Webbook
ripol	1235.00		NIST Webbook
ripol	1260.00		NIST Webbook
ripol	1223.00		NIST Webbook
ripol	1232.00		NIST Webbook
ripol	1227.00		NIST Webbook
ripol	1232.00		NIST Webbook
ripol	1223.00		NIST Webbook
ripol	1235.00		NIST Webbook
ripol	1276.00		NIST Webbook
ripol	1223.00		NIST Webbook
ripol	1276.00		NIST Webbook
tb	458.76	K	Joback Method
tc	681.00 ± 1.50	K	NIST Webbook
tc	702.20 ± 1.50	K	NIST Webbook
tc	705.00 ± 1.00	K	NIST Webbook
tc	704.00 ± 3.00	K	NIST Webbook
tf	230.10 ± 0.05	K	NIST Webbook
tf	227.80 ± 0.30	K	NIST Webbook
tf	230.08 ± 0.07	K	NIST Webbook
tf	229.85 ± 0.50	K	NIST Webbook
tf	229.90 ± 0.50	K	NIST Webbook

tf	230.14 ± 0.03	K	NIST Webbook
tf	229.89 ± 0.40	K	NIST Webbook
tf	230.09 ± 0.30	K	NIST Webbook
tf	229.95 ± 0.60	K	NIST Webbook
tf	243.00 ± 20.00	K	NIST Webbook
tf	229.89 ± 0.50	K	NIST Webbook
tf	228.00 ± 5.00	K	NIST Webbook
tf	229.90 ± 0.50	K	NIST Webbook
tf	222.00 ± 7.00	K	NIST Webbook
tt	230.11 ± 0.06	K	NIST Webbook
tt	230.12 ± 0.06	K	NIST Webbook
tt	230.16 ± 0.03	K	NIST Webbook
tt	230.15 ± 0.10	K	NIST Webbook
tt	230.23 ± 0.05	K	NIST Webbook
tt	230.10 ± 0.20	K	NIST Webbook
vc	0.477	m3/kmol	Joback Method

Temperature Dependent Properties

Property code	Value	Unit	Temperature [K]	Source
cpg	236.77	J/mol×K	400.00	NIST Webbook
cpg	272.00	J/mol×K	450.00	NIST Webbook
dvisc	0.0022946	Pa×s	263.34	Joback Method
dvisc	0.0013547	Pa×s	302.43	Joback Method
dvisc	0.0005024	Pa×s	419.68	Joback Method
dvisc	0.0006533	Pa×s	380.59	Joback Method
dvisc	0.0009023	Pa×s	341.51	Joback Method
dvisc	0.0004040	Pa×s	458.76	Joback Method
dvisc	0.0046703	Pa×s	224.26	Joback Method
hfust	14.43	kJ/mol	242.80	NIST Webbook
hfust	14.43	kJ/mol	242.80	NIST Webbook
hsubt	64.80	kJ/mol	230.00	NIST Webbook
hvapt	45.50	kJ/mol	422.00	NIST Webbook
rhol	874.05	kg/m3	323.15	Excess Molar Volume along with Viscosity, Flash Point, and Refractive Index for Binary Mixtures of cis-Decalin or trans-Decalin with C9 to C11 n-Alkanes

rhol	881.65	kg/m3	313.15	Excess Molar Volume along with Viscosity, Flash Point, and Refractive Index for Binary Mixtures of cis-Decalin or trans-Decalin with C9 to C11 n-Alkanes
rhol	885.46	kg/m3	308.15	Excess Molar Volume along with Viscosity, Flash Point, and Refractive Index for Binary Mixtures of cis-Decalin or trans-Decalin with C9 to C11 n-Alkanes
rhol	889.26	kg/m3	303.15	Excess Molar Volume along with Viscosity, Flash Point, and Refractive Index for Binary Mixtures of cis-Decalin or trans-Decalin with C9 to C11 n-Alkanes
rhol	893.06	kg/m3	298.15	Excess Molar Volume along with Viscosity, Flash Point, and Refractive Index for Binary Mixtures of cis-Decalin or trans-Decalin with C9 to C11 n-Alkanes
rhol	896.85	kg/m3	293.15	Excess Molar Volume along with Viscosity, Flash Point, and Refractive Index for Binary Mixtures of cis-Decalin or trans-Decalin with C9 to C11 n-Alkanes

rhol	877.85	kg/m3	318.15	Excess Molar Volume along with Viscosity, Flash Point, and Refractive Index for Binary Mixtures of cis-Decalin or trans-Decalin with C9 to C11 n-Alkanes

Datasets

Mass density, kg/m3

Temperature, K - Liquid	Pressure, kPa - Liquid	Mass density, kg/m3 - Liquid
303.15	100.00	888.5
303.15	5000.00	891.4
303.15	10000.00	894.4
303.15	15000.00	897.3
303.15	20000.00	899.9
303.15	25000.00	902.8
303.15	30000.00	905.5
303.15	35000.00	908.0
303.15	40000.00	910.6
303.15	45000.00	913.0
303.15	50000.00	915.3
303.15	55000.00	917.6
303.15	60000.00	919.9
303.15	65000.00	922.1
323.15	100.00	873.2
323.15	5000.00	876.5
323.15	10000.00	879.8
323.15	15000.00	883.0
323.15	20000.00	886.0
323.15	25000.00	889.0
323.15	30000.00	891.8
323.15	35000.00	894.6
323.15	40000.00	897.3
323.15	45000.00	899.9
323.15	50000.00	902.4

323.15	55000.00	904.8
323.15	60000.00	907.3
323.15	65000.00	909.6
343.15	100.00	857.8
343.15	5000.00	861.5
343.15	10000.00	865.1
343.15	15000.00	868.6
343.15	20000.00	871.9
343.15	25000.00	875.1
343.15	30000.00	878.3
343.15	35000.00	881.2
343.15	40000.00	884.1
343.15	45000.00	887.0
343.15	50000.00	889.7
343.15	55000.00	892.3
343.15	60000.00	894.9
343.15	65000.00	897.4

Reference *https://www.doi.org/10.1016/j.fluid.2006.12.011*

Sources

Crippen Method:	http://pubs.acs.org/doi/abs/10.1021/ci990307l
Stereoisomeric effects on volumetric properties under pressure for the system cis- + trans-decalin:	https://www.doi.org/10.1016/j.fluid.2006.12.011
Solubility of dibenzothiophene in nine organic solvents: Experimental measurement and thermodynamic modelling:	https://www.doi.org/10.1016/j.jct.2018.09.017
McGowan Method:	http://link.springer.com/article/10.1007/BF02311772
Thermodynamic Studies of Solubility for Naphthalene in 12 Solvents from 279 to 330 K:	https://www.doi.org/10.1021/acs.jced.9b00064
High-Pressure Viscosity and Density Measurements of the Ternary System Methylcyclohexane + cis-Decalin + 2,2,4,4,6,8,8-Heptamethylnonane:	https://www.doi.org/10.1021/je034067o
Speeds of Sound and Densities of Ternary and Quaternary Mixtures of Tetralin, Decalin, n-Decane, and n-Hexadecane: Experiments and Thermodynamic Modeling with PC-SAFT Equation of State:	https://www.doi.org/10.1021/acs.jced.6b00246
Infinite dilution activity coefficients, specific retention volumes and solvation thermodynamics of organic solutes in a C78 highly branched alkane solvent:	https://www.doi.org/10.1016/j.fluid.2006.07.015
Density and Viscosity of Decalin, Cyclohexane, and Toluene Binary Mixtures at (283.15, 293.15, 303.15, 313.15, and 323.15) K:	https://www.doi.org/10.1021/je800940j
High pressure speed of sound and density of (decalin + n-decane), (decalin + n-hexadecane) and (n-decane + n-hexadecane) systems and thermodynamic modelling with RKPR equation of state:	https://www.doi.org/10.1016/j.jct.2015.12.002
Liquid–Liquid Equilibria at Three Temperatures (between 280.15 K and 338.15 K) of Binary, Ternary and Quaternary Systems Involving Monoethylene Glycol, Water, Cyclohexane, para-Xylene, trans- and cis-Dimethylcyclohexane, and trans- and cis-Decahydronaphthalene:	https://www.doi.org/10.1021/je500625r
Excess Molar Volume along with Viscosity, Flash Point, and Refractive Index of Binary Mixtures of cis-Decalin or trans-Decalin with C9 to C11 Alcohols:	https://www.doi.org/10.1021/je400250u
Crippen Method:	https://www.chemeo.com/doc/models/crippen_log10ws
Densities and Viscosities for the Ternary System of Decalin + Methylcyclohexane + Cyclopentanol and Corresponding Binaries at T = 293.15 to 343.15 K:	https://www.doi.org/10.1021/acs.jced.8b01004
Joback Method:	https://en.wikipedia.org/wiki/Joback_method
NIST Webbook:	http://webbook.nist.gov/cgi/cbook.cgi?ID=C493016&Units=SI
High-pressure phase behaviour of the binary system {CO2 + cis-decalin} from (292.75 to 373.75) K:	https://www.doi.org/10.1016/j.jct.2008.05.008

Legend

chl:	Standard liquid 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
hfl:	Liquid phase 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
ie:	Ionization energy
log10ws:	Log10 of Water solubility in mol/l
logp:	Octanol/Water partition coefficient
mcvol:	McGowan's characteristic volume
pc:	Critical Pressure
rhol:	Liquid Density
rinpol:	Non-polar retention indices
ripol:	Polar retention indices
tb:	Normal Boiling Point Temperature
tc:	Critical Temperature
tf:	Normal melting (fusion) point
tt:	Triple Point Temperature
vc:	Critical Volume