2-Butene, (E)-

Other names:	(E)-2-BUTENE
	(E)-2-C4H8
	(E)-but-2-ene
	2-Butene, trans-
	2-TRANS-BUTENE
	Butene-2,trans
	TANS-1,2-DIMETHYLETHYLENE
	TRANS-2-BUTENE
	t-Butene-2
	trans-1,2-Dimethylethylene
	trans-Butene
Inchi:	InChI=1S/C4H8/c1-3-4-2/h3-4H,1-2H3/b4-3+
InchiKey:	IAQRGUVFOMOMEM-ONEGZZNKSA-N
Formula:	C4H8
SMILES:	CC=CC
Mol. weight [g/mol]:	56.11
CAS:	624-64-6

Physical Properties

Property code	Value	Unit	Source
af	0.2050		KDB
affp	747.00	kJ/mol	NIST Webbook
basg	719.90	kJ/mol	NIST Webbook
chg	-2706.60 ± 0.96	kJ/mol	NIST Webbook
dm	0.00	debye	KDB
gf	63.01	kJ/mol	KDB
hcg	2684.37	kJ/mol	KDB
hcn	2508.308	kJ/mol	KDB
hf	-10.80 ± 1.00	kJ/mol	NIST Webbook
hf	-11.18	kJ/mol	KDB
hfus	6.32	kJ/mol	Joback Method
hvap	21.30	kJ/mol	NIST Webbook
hvap	21.97	kJ/mol	NIST Webbook
ie	9.10 ± 0.02	eV	NIST Webbook
ie	9.10 ± 0.01	eV	NIST Webbook
ie	9.12 ± 0.02	eV	NIST Webbook
ie	9.11	eV	NIST Webbook

ie	9.11	eV	NIST Webbook
ie	9.32	eV	NIST Webbook
ie	9.50	eV	NIST Webbook
ie	9.37	eV	NIST Webbook
ie	9.12 ± 0.01	eV	NIST Webbook
ie	9.13	eV	NIST Webbook
ie	9.13 ± 0.01	eV	NIST Webbook
ie	9.09	eV	NIST Webbook
ie	9.14	eV	NIST Webbook
ie	9.09	eV	NIST Webbook
ie	9.10 ± 0.01	eV	NIST Webbook
ie	9.12	eV	NIST Webbook
ie	9.11	eV	NIST Webbook
log10ws	-1.35		Crippen Method
logp	1.582		Crippen Method
mcvol	62.920	ml/mol	McGowan Method
nfpaf	%!d(float64=4)		KDB
nfpah	%!d(float64=1)		KDB
pc	3985.00	kPa	KDB
pc	4027.30	kPa	Thermodynamic properties of the butenes Part I. Experimental densities, vapor pressures, and critical points
pc	4100.00 ± 20.00	kPa	NIST Webbook
rhoc	236.21 ± 1.12	kg/m3	NIST Webbook
rinpol	407.00		NIST Webbook
rinpol	406.00		NIST Webbook
rinpol	408.00		NIST Webbook
rinpol	406.00		NIST Webbook
rinpol	406.00		NIST Webbook
rinpol	405.00		NIST Webbook
rinpol	412.00		NIST Webbook
rinpol	410.00		NIST Webbook
rinpol	417.00		NIST Webbook
rinpol	383.00		NIST Webbook
rinpol	406.00		NIST Webbook
rinpol	411.00		NIST Webbook
rinpol	408.00		NIST Webbook
rinpol	408.40		NIST Webbook
rinpol	406.42		NIST Webbook
rinpol	414.00		NIST Webbook
rinpol	412.30		NIST Webbook
rinpol	407.00		NIST Webbook
rinpol	412.00		NIST Webbook
rinpol	409.00		NIST Webbook

rinpol	412.00		NIST Webbook
rinpol	406.00		NIST Webbook
rinpol	408.00		NIST Webbook
rinpol	411.00		NIST Webbook
rinpol	410.00		NIST Webbook
rinpol	407.00		NIST Webbook
rinpol	406.00		NIST Webbook
rinpol	411.00		NIST Webbook
rinpol	406.42		NIST Webbook
rinpol	413.00		NIST Webbook
rinpol	414.00		NIST Webbook
rinpol	410.20		NIST Webbook
rinpol	402.00		NIST Webbook
rinpol	406.00		NIST Webbook
rinpol	406.90		NIST Webbook
rinpol	410.00		NIST Webbook
rinpol	410.00		NIST Webbook
rinpol	405.00		NIST Webbook
rinpol	406.50		NIST Webbook
rinpol	404.40		NIST Webbook
rinpol	406.10		NIST Webbook
rinpol	406.49		NIST Webbook
rinpol	405.00		NIST Webbook
rinpol	407.00		NIST Webbook
rinpol	406.70		NIST Webbook
rinpol	403.00		NIST Webbook
rinpol	400.00		NIST Webbook
rinpol	411.00		NIST Webbook
ripol	464.00		NIST Webbook
ripol	450.00		NIST Webbook
ripol	450.00		NIST Webbook
sl	204.97	J/mol×K	NIST Webbook
sl	163.50	J/mol×K	NIST Webbook
sl	205.31	J/mol×K	NIST Webbook
tb	274.15 ± 0.50	K	NIST Webbook
tb	274.11 ± 0.15	K	NIST Webbook
tb	274.01 ± 0.20	K	NIST Webbook
tb	273.98 ± 0.55	K	NIST Webbook
tb	274.05 ± 0.50	K	NIST Webbook
tb	274.20 ± 0.40	K	NIST Webbook
tb	274.00	K	NIST Webbook
tb	274.20	K	NIST Webbook
tb	274.75 ± 0.60	K	NIST Webbook
tb	274.75 ± 0.60	K	NIST Webbook

tb	274.03	K	KDB
tc	428.61 ± 0.30	K	NIST Webbook
tc	428.60	K	NIST Webbook
tc	428.60 ± 0.10	K	NIST Webbook
tc	428.63	K	KDB
tf	167.35 ± 0.50	K	NIST Webbook
tf	167.62	K	KDB
tt	167.62 ± 0.02	K	NIST Webbook
tt	167.30 ± 0.20	K	NIST Webbook
tt	167.61 ± 0.02	K	NIST Webbook
vc	0.238	m3/kmol	KDB
vc	0.238	m3/kmol	NIST Webbook
zc	0.2661250		KDB
zra	0.27		KDB

Temperature Dependent Properties

Property code	Value	Unit	Temperature [K]	Source
cpg	102.63	J/mol×K	371.50	NIST Webbook
cpg	94.93	J/mol×K	332.90	NIST Webbook
cpg	87.78	J/mol×K	298.60	NIST Webbook
cpl	122.05	J/mol×K	259.60	NIST Webbook
cpl	124.40	J/mol×K	280.00	NIST Webbook
cpl	122.34	J/mol×K	270280.00	NIST Webbook
dvisc	0.0003443	Pa×s	212.42	Joback Method
dvisc	0.0002406	Pa×s	239.97	Joback Method
dvisc	0.0010280	Pa×s	157.31	Joback Method
dvisc	0.0001810	Pa×s	267.53	Joback Method
dvisc	0.0005483	Pa×s	184.87	Joback Method
dvisc	0.0001436	Pa×s	295.08	Joback Method
dvisc	0.0025167	Pa×s	129.76	Joback Method
hfust	9.86	kJ/mol	167.30	NIST Webbook
hfust	9.76	kJ/mol	167.62	NIST Webbook
hfust	9.76	kJ/mol	167.61	NIST Webbook
hfust	9.76	kJ/mol	167.60	NIST Webbook
hfust	9.76	kJ/mol	167.60	NIST Webbook
hvapt	22.76 ± 0.63	kJ/mol	274.00	NIST Webbook
hvapt	23.60	kJ/mol	294.00	NIST Webbook
hvapt	23.90	kJ/mol	246.00	NIST Webbook
hvapt	23.20	kJ/mol	405.00	NIST Webbook
hvapt	22.80 ± 0.10	kJ/mol	274.00	NIST Webbook

hvapt	23.90	kJ/mol	244.00	NIST Webbook
hvapt	24.20	kJ/mol	238.50	NIST Webbook
hvapt	22.76	kJ/mol	274.04	NIST Webbook
hvapt	22.72	kJ/mol	274.00	NIST Webbook
hvapt	23.83	kJ/mol	273.40	NIST Webbook
hvapt	22.76	kJ/mol	274.00	KDB
hvapt	23.30	kJ/mol	349.00	NIST Webbook
pvap	423.50	kPa	318.34	Vapor-Liquid Equilibrium for Tetrahydrothiophene + n-Butane, + trans-2-Butene, + 2-Methylpropane, and + 2-Methylpropene
pvap	868.50	kPa	347.06	Vapor-Liquid Equilibrium for Tetrahydrothiophene + n-Butane, + trans-2-Butene, + 2-Methylpropane, and + 2-Methylpropene
pvap	929.20	kPa	350.30	Vapor-Liquid Equilibrium for Dimethyl Disulfide + Butane, + trans-But-2-ene, + 2-Methylpropane, + 2-Methylpropene, + Ethanol, and 2-Ethoxy-2-methylpropane
pvap	317.30	kPa	308.14	Vapor-Liquid Equilibrium for Thiophene + Butane, + trans-But-2-ene, + 2-Methylpropane, and + 2-Methylpropene
pvap	1269.20	kPa	364.50	Vapor Liquid Equilibrium for Six Binary Systems of C4-Hydrocarbons + 2-Propanone
pvap	606.14	kPa	332.08	Vapor Liquid Equilibrium for the Trans-2-Butene + Methanol, + Ethanol, + 2-Propanol, + 2-Butanol and + 2-Methyl-2-Propanol Systems at 332 K

pvap	606.44	kPa	332.08	Vapor Liquid Equilibrium for the Trans-2-Butene + Methanol, + Ethanol, + 2-Propanol, + 2-Butanol and + 2-Methyl-2-Propanol Systems at 332 K
pvap	606.94	kPa	332.07	Vapor Liquid Equilibrium for the Trans-2-Butene + Methanol, + Ethanol, + 2-Propanol, + 2-Butanol and + 2-Methyl-2-Propanol Systems at 332 K
pvap	605.54	kPa	332.04	Vapor Liquid Equilibrium for the Trans-2-Butene + Methanol, + Ethanol, + 2-Propanol, + 2-Butanol and + 2-Methyl-2-Propanol Systems at 332 K
pvap	417.30	kPa	317.46	Vapour liquid equilibrium for the systems diethyl sulphide + 1-butene, +cis-2-butene, +2-methylpropane, +2-methylpropene, +n-butane, +trans-2-butene
pvap	413.80	kPa	317.29	Isothermal binary vapour liquid equilibrium for butanes and butenes with dimethylsulphide
pvap	606.54	kPa	332.05	Vapor-Liquid Equilibrium for 1-Propanol + 1-Butene, + cis-2-Butene, + 2-Methyl-propene, + trans-2-Butene, + n-Butane, and + 2-Methyl-propane

pvap	666.10	kPa	335.86	Vapor-Liquid Equilibrium for Thiophene + Butane, + trans-But-2-ene, + 2-Methylpropane, and + 2-Methylpropene
pvap	605.74	kPa	332.06	Vapor Liquid Equilibrium for the Trans-2-Butene + Methanol, + Ethanol, + 2-Propanol, + 2-Butanol and + 2-Methyl-2-Propanol Systems at 332 K
rhol	604.00	kg/m3	293.00	KDB
sfust	58.94	J/mol×K	167.30	NIST Webbook
sfust	58.21	J/mol×K	167.61	NIST Webbook
sfust	58.20	J/mol×K	167.62	NIST Webbook
srf	0.01	N/m	293.20	KDB
svapt	83.04	J/mol×K	274.04	NIST Webbook

Correlations

Information	Value
Property code	pvap
Equation	ln(Pvp) = A + B/(T + C)
Coeff. A	1.42351e+01
Coeff. B	-2.38673e+03
Coeff. C	-2.60150e+01
Temperature range (K), min.	197.14
Temperature range (K), max.	293.48

Information	Value
Property code	pvap
Equation	ln(Pvp) = A + B/T + C*ln(T) + D*T^2
Coeff. A	6.78830e+01
Coeff. B	-4.65896e+03
Coeff. C	-8.40556e+00
Coeff. D	1.22646e-05
Temperature range (K), min.	167.62
Temperature range (K), max.	428.63

Sources

KDB Vapor Pressure Data:	https://www.cheric.org/research/kdb/hcprop/showprop.php?cmpid=188
Henry s Law Constants and Infinite Dilution Activity Coefficients of Propane, Propene, Butane, 2-Methylpropane, 1-Butene, 2-Methylpropene, trans-2-Butene, cis-2-Butene, 1,3-Butadiene, Dimethyl Ether, Chloroethane, and 1,1-Difluoroethane in [illegible]	https://www.doi.org/10.1021/je050343i
Henry's constants and infinite dilution activity coefficients of propane, propene, butane, isobutane, 1-butene, isobutene, trans-2-butene and 1,3-butadiene in 2-methyl-1-butanol, 3-methyl-1-butanol, and 2-methyl-2-butanol:	https://www.doi.org/10.1016/j.jct.2003.08.018
Henry's law constants and infinite dilution activity coefficients of propane, propene, butane, isobutane, 1-butene, isobutene, trans-2-butene, and 1,3-butadiene in 1-propanol at T=(260 to 340) K:	https://www.doi.org/10.1021/je049723e
Joback Method:	https://en.wikipedia.org/wiki/Joback_method
Vapor Liquid Equilibrium for the Systems trans-2-Butene + Methanol, + 1-Propanol, + 2-Propanol, + 2-Butanol, and + 2-Methyl-2-propanol at 364.5 K:	https://www.doi.org/10.1021/je700690q
Thermodynamic properties of the butenes. Part II. Experimental densities, vapor pressures, and critical points:	https://www.doi.org/10.1016/j.fluid.2004.09.013
Henry's Law Constants and Infinite Dilution Activity Coefficients of Propane, Propene, Butane, 2-Methylpropane, 1-Butene, 2-Methylpropene, trans-2-Butene, cis-2-Butene, 1,3-Butadiene, Dimethyl Ether, Chloroethane, and 1,1-Difluoroethane in 2-Propen-1-ol:	https://www.doi.org/10.1021/je0502647
Crippen Method:	https://www.chemeo.com/doc/models/crippen_log10ws
Henry's Law Constants and Infinite Dilution Activity Coefficients of Propane, Propene, Butane, 2-Methylpropane, 1-Butene, 2-Methylpropene, trans-2-Butene, cis-2-Butene, 1,3-Butadiene, Dimethyl Ether, Chloroethane, and 1,1-Difluoroethane in 2-Methylphenol, 3-Methylphenol, and 4-Methylphenol:	https://www.doi.org/10.1021/je100529s
Vapour-liquid equilibrium for the systems diethyl sulphide + 1-butene, + cis-2-butene, + 2-methylpropane, +2-methylpropene, + n-butane, + trans-2-butene:	https://www.doi.org/10.1016/j.fluid.2010.01.006
Crippen Method:	http://pubs.acs.org/doi/abs/10.1021/ci990307l
Henry's constants and infinite dilution activity coefficients of propane, propene, butane, isobutane, 1-butene, isobutene, trans-2-butene, and 1,3-butadiene in 1-pentanol, 2-pentanol and 3-pentanol:	https://www.doi.org/10.1016/j.jct.2004.11.005
Vapor Liquid Equilibrium for [illegible]	https://www.doi.org/10.1021/je800896m
Henry's Law Constants and Infinite Dilution Activity Coefficients of Propane, Propene, Butane, 2-Methylpropane, 1-Butene, 2-Methylpropene, trans-2-Butene, cis-2-Butene, 1,3-Butadiene, Dimethyl Ether, Chloroethane, and 1,1-Difluoroethane in Benzene, Toluene, o-Xylene, m-Xylene, p-Xylene, and Styrene:	https://www.doi.org/10.1021/je060395n
KDB:	https://www.cheric.org/research/kdb/hcprop/showprop.php?cmpid=188
Vapor-Liquid Equilibrium for Dimethyl Disulfide + Butane, + trans-But-2-ene, + [illegible]	https://www.doi.org/10.1021/je200039y
Vapor Liquid Equilibrium for [illegible]	https://www.doi.org/10.1021/je049959i
Vapor Liquid Equilibrium for Thiophene + [illegible]	https://www.doi.org/10.1021/je101343m
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Henry s law constants of 1-butene, 2-methylpropene, trans-2-butene, and 1,3-butadiene in methanol at 374-490K:	https://www.doi.org/10.1016/j.fluid.2006.06.024
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McGowan Method:	http://link.springer.com/article/10.1007/BF02311772
Vapour liquid equilibrium for the ethyl ethanoate + 1-butene, +cis-2-butene, +trans-2-butene, +2-methylpropene, +n-butane and +2-methylpropane:	https://www.doi.org/10.1016/j.fluid.2004.10.023
Henry's Constants and Infinite Dilution Activity Coefficients of Propane, Propene, Butane, Isobutane, 1-Butene, Isobutene, trans-2-Butene and 1,3-Butadiene in 2-Propanol at 250-330	https://www.doi.org/10.1021/je0342116
Henry's constants and infinite dilution activity coefficients of propane, propene, butane, isobutane, 1-butene, isobutene, trans-2-butene, and 1,3-butadiene in isobutanol and tert-butanol:	https://www.doi.org/10.1016/j.jct.2004.05.010
Isothermal binary vapour liquid equilibrium for butanes and butenes with dimethyl sulphide:	https://www.doi.org/10.1016/j.fluid.2008.01.030
NIST Webbook:	http://webbook.nist.gov/cgi/cbook.cgi?ID=C624646&Units=SI
Vapor Liquid Equilibrium for the Trans-2-Butene + Methanol, + Ethanol, + 2-Propanol, + 2-Butanol and + 2-Methyl-2-Propanol Systems at 332 K:	https://www.doi.org/10.1021/je0341256
The Yaws Handbook of Vapor Pressure:	https://www.sciencedirect.com/book/9780128029992/the-yaws-handbook-of-vapor-pressure
Henry s Law Constants and Infinite Dilution Activity Coefficients of Propane, Propene, Butane, 2-Methylpropane, 1-Butene, 2-Methylpropene, trans-2-Butene, cis-2-Butene, 1,3-Butadiene, Dimethylether, Chloroethane, 1,1-Difluoroethane, and Hexane in Tetrahydropyran:	https://www.doi.org/10.1021/je700270d

Legend

af:	Acentric Factor

affp:	Proton affinity
basg:	Gas basicity
chg:	Standard gas enthalpy of combustion
cpg:	Ideal gas heat capacity
cpl:	Liquid phase heat capacity
dm:	Dipole Moment
dvisc:	Dynamic viscosity
gf:	Standard Gibbs free energy of formation
hcg:	Heat of Combustion, Gross form
hcn:	Heat of Combustion, Net Form
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
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
nfpaf:	NFPA Fire Rating
nfpah:	NFPA Health Rating
pc:	Critical Pressure
pvap:	Vapor pressure
rhoc:	Critical density
rhol:	Liquid Density
rinpol:	Non-polar retention indices
ripol:	Polar retention indices
sfust:	Entropy of fusion at a given temperature
sl:	Liquid phase molar entropy at standard conditions
srf:	Surface Tension
svapt:	Entropy of vaporization at a given temperature
tb:	Normal Boiling Point Temperature
tc:	Critical Temperature
tf:	Normal melting (fusion) point
tt:	Triple Point Temperature
vc:	Critical Volume
zc:	Critical Compressibility
zra:	Rackett Parameter