Xylose

Other names: (+)-xylose
D-(+)-xylose
D-xylose
Wood sugar
Xylo-Pfan
xylose, D-

Inchi: InChI=1S/C5H10O5/c6-1-3(8)5(10)4(9)2-7/h1,3-5,7-10H,2H2/t3-,4+,5+/m0/s1

InchiKey: PYMYPHUHKUWMLA-VPENINKCSA-N

Formula: C5H10O5

SMILES: O=CC(O)C(O)C(O)CO

Mol. weight [g/mol]: 150.13

CAS: 58-86-6

Physical Properties

Property code	Value	Unit	Source
gf	-662.90	kJ/mol	Joback Method
hf	-856.87	kJ/mol	Joback Method
hfus	16.78	kJ/mol	Joback Method
hvap	99.00	kJ/mol	Joback Method
log10ws	1.41		Crippen Method
logp	-2.740		Crippen Method
mcvol	106.360	ml/mol	McGowan Method
pc	6588.38	kPa	Joback Method
ss	143.50	J/mol×K	NIST Webbook
tb	729.86	K	Joback Method
tc	900.63	K	Joback Method
tf	386.39	K	Joback Method
vc	0.391	m3/kmol	Joback Method

Temperature Dependent Properties

Property code	Value	Unit	Temperature [K]	Source
cpg	303.13	J/mol×K	729.86	Joback Method
cpg	308.60	J/mol×K	758.32	Joback Method

cpg	331.77	J/mol×K	900.63	Joback Method
cpg	313.78	J/mol×K	786.78	Joback Method
cpg	318.67	J/mol×K	815.24	Joback Method
cpg	323.29	J/mol×K	843.71	Joback Method
cpg	327.65	J/mol×K	872.17	Joback Method
cps	2.21	J/mol×K	10.97	Thermochemistry of a-D-xylose(cr)
cps	14.39	J/mol×K	25.13	Thermochemistry of a-D-xylose(cr)
cps	16.85	J/mol×K	27.98	Thermochemistry of a-D-xylose(cr)
cps	19.42	J/mol×K	31.15	Thermochemistry of a-D-xylose(cr)
cps	22.14	J/mol×K	34.69	Thermochemistry of a-D-xylose(cr)
cps	25.09	J/mol×K	38.59	Thermochemistry of a-D-xylose(cr)
cps	27.98	J/mol×K	42.93	Thermochemistry of a-D-xylose(cr)
cps	31.18	J/mol×K	47.76	Thermochemistry of a-D-xylose(cr)
cps	34.56	J/mol×K	53.12	Thermochemistry of a-D-xylose(cr)
cps	38.30	J/mol×K	59.09	Thermochemistry of a-D-xylose(cr)
cps	42.39	J/mol×K	65.77	Thermochemistry of a-D-xylose(cr)
cps	46.67	J/mol×K	73.12	Thermochemistry of a-D-xylose(cr)
cps	51.82	J/mol×K	81.26	Thermochemistry of a-D-xylose(cr)
cps	57.70	J/mol×K	90.30	Thermochemistry of a-D-xylose(cr)
cps	63.68	J/mol×K	100.35	Thermochemistry of a-D-xylose(cr)
cps	69.55	J/mol×K	110.61	Thermochemistry of a-D-xylose(cr)
cps	75.36	J/mol×K	120.64	Thermochemistry of a-D-xylose(cr)
cps	81.56	J/mol×K	130.77	Thermochemistry of a-D-xylose(cr)
cps	87.47	J/mol×K	140.87	Thermochemistry of a-D-xylose(cr)
cps	93.15	J/mol×K	151.03	Thermochemistry of a-D-xylose(cr)
cps	99.11	J/mol×K	161.11	Thermochemistry of a-D-xylose(cr)
cps	104.92	J/mol×K	171.25	Thermochemistry of a-D-xylose(cr)
cps	110.56	J/mol×K	181.48	Thermochemistry of a-D-xylose(cr)

cps	116.09	J/mol×K	191.69	Thermochemistry of a-D-xylose(cr)
cps	122.16	J/mol×K	201.94	Thermochemistry of a-D-xylose(cr)
cps	128.07	J/mol×K	212.26	Thermochemistry of a-D-xylose(cr)
cps	134.51	J/mol×K	222.61	Thermochemistry of a-D-xylose(cr)
cps	140.48	J/mol×K	232.87	Thermochemistry of a-D-xylose(cr)
cps	146.31	J/mol×K	243.02	Thermochemistry of a-D-xylose(cr)
cps	152.43	J/mol×K	253.18	Thermochemistry of a-D-xylose(cr)
cps	158.02	J/mol×K	263.22	Thermochemistry of a-D-xylose(cr)
cps	163.59	J/mol×K	273.41	Thermochemistry of a-D-xylose(cr)
cps	169.47	J/mol×K	283.51	Thermochemistry of a-D-xylose(cr)
cps	175.31	J/mol×K	293.61	Thermochemistry of a-D-xylose(cr)
cps	181.61	J/mol×K	303.66	Thermochemistry of a-D-xylose(cr)
cps	1.83	J/mol×K	10.35	Thermochemistry of a-D-xylose(cr)
cps	2.55	J/mol×K	11.52	Thermochemistry of a-D-xylose(cr)
cps	3.41	J/mol×K	12.72	Thermochemistry of a-D-xylose(cr)
cps	4.55	J/mol×K	14.25	Thermochemistry of a-D-xylose(cr)
cps	5.87	J/mol×K	15.84	Thermochemistry of a-D-xylose(cr)
cps	7.44	J/mol×K	17.61	Thermochemistry of a-D-xylose(cr)
cps	8.79	J/mol×K	18.99	Thermochemistry of a-D-xylose(cr)
cps	10.74	J/mol×K	21.17	Thermochemistry of a-D-xylose(cr)
cps	12.06	J/mol×K	22.58	Thermochemistry of a-D-xylose(cr)
cps	15.41	J/mol×K	26.29	Thermochemistry of a-D-xylose(cr)
cps	17.97	J/mol×K	29.32	Thermochemistry of a-D-xylose(cr)
cps	20.56	J/mol×K	32.68	Thermochemistry of a-D-xylose(cr)
cps	23.55	J/mol×K	36.33	Thermochemistry of a-D-xylose(cr)
cps	26.51	J/mol×K	40.53	Thermochemistry of a-D-xylose(cr)

cps	29.46	J/mol×K	45.13	Thermochemistry of a-D-xylose(cr)
cps	32.51	J/mol×K	50.20	Thermochemistry of a-D-xylose(cr)
cps	36.43	J/mol×K	55.82	Thermochemistry of a-D-xylose(cr)
cps	40.20	J/mol×K	62.21	Thermochemistry of a-D-xylose(cr)
cps	44.37	J/mol×K	69.15	Thermochemistry of a-D-xylose(cr)
cps	49.05	J/mol×K	76.88	Thermochemistry of a-D-xylose(cr)
cps	54.66	J/mol×K	85.51	Thermochemistry of a-D-xylose(cr)
cps	60.59	J/mol×K	95.15	Thermochemistry of a-D-xylose(cr)
cps	66.61	J/mol×K	105.25	Thermochemistry of a-D-xylose(cr)
cps	72.27	J/mol×K	115.43	Thermochemistry of a-D-xylose(cr)
cps	78.61	J/mol×K	125.54	Thermochemistry of a-D-xylose(cr)
cps	84.75	J/mol×K	135.74	Thermochemistry of a-D-xylose(cr)
cps	90.11	J/mol×K	145.76	Thermochemistry of a-D-xylose(cr)
cps	95.92	J/mol×K	155.98	Thermochemistry of a-D-xylose(cr)
cps	102.13	J/mol×K	166.15	Thermochemistry of a-D-xylose(cr)
cps	107.50	J/mol×K	176.34	Thermochemistry of a-D-xylose(cr)
cps	113.51	J/mol×K	186.59	Thermochemistry of a-D-xylose(cr)
cps	119.53	J/mol×K	196.81	Thermochemistry of a-D-xylose(cr)
cps	125.24	J/mol×K	207.17	Thermochemistry of a-D-xylose(cr)
cps	9.97	J/mol×K	20.27	Thermochemistry of a-D-xylose(cr)
cps	137.35	J/mol×K	227.74	Thermochemistry of a-D-xylose(cr)
cps	142.93	J/mol×K	237.95	Thermochemistry of a-D-xylose(cr)
cps	148.90	J/mol×K	248.07	Thermochemistry of a-D-xylose(cr)
cps	154.94	J/mol×K	258.24	Thermochemistry of a-D-xylose(cr)
cps	160.56	J/mol×K	268.36	Thermochemistry of a-D-xylose(cr)
cps	166.47	J/mol×K	278.46	Thermochemistry of a-D-xylose(cr)

cps	172.37	J/mol×K	288.47	Thermochemistry of a-D-xylose(cr)
cps	177.87	J/mol×K	298.67	Thermochemistry of a-D-xylose(cr)
cps	8.19	J/mol×K	18.42	Thermochemistry of a-D-xylose(cr)
cps	6.47	J/mol×K	16.59	Thermochemistry of a-D-xylose(cr)
cps	5.24	J/mol×K	15.07	Thermochemistry of a-D-xylose(cr)
cps	4.03	J/mol×K	13.56	Thermochemistry of a-D-xylose(cr)
cps	2.74	J/mol×K	12.19	Thermochemistry of a-D-xylose(cr)
cps	13.08	J/mol×K	23.64	Thermochemistry of a-D-xylose(cr)
cps	130.91	J/mol×K	217.50	Thermochemistry of a-D-xylose(cr)
dvisc	0.0157042	Pa×s	386.39	Joback Method
dvisc	0.0000276	Pa×s	558.12	Joback Method
dvisc	0.0000024	Pa×s	672.62	Joback Method
dvisc	0.0000073	Pa×s	615.37	Joback Method
dvisc	0.0001411	Pa×s	500.88	Joback Method
dvisc	0.0010983	Pa×s	443.64	Joback Method
dvisc	0.0000010	Pa×s	729.86	Joback Method
hfust	31.70	kJ/mol	416.20	NIST Webbook
hsubt	158.00 ± 3.10	kJ/mol	382.50	NIST Webbook

Sources

Study of solute-solute and solute-solvent interactions of homologous series of some alpha-amino acids in aqueous-D-xylose solutions at different temperatures:	https://www.doi.org/10.1016/j.jct.2016.06.030
Temperature dependence of the volumetric and acoustic behaviour of [illegible] physicochemical methods:	https://www.doi.org/10.1016/j.jct.2017.05.032
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Thermochemistry of a-D-xylose(cr):	https://www.doi.org/10.1016/j.jct.2012.09.028
Volumetric and Viscosity Properties of Monosaccharides in Aqueous Amino Acid Solutions at 298.15 K:	https://www.doi.org/10.1021/je050412t
Molecular Interactions of Saccharides and Their Derivatives with Thiamine HCl and Pyridoxine HCl Vitamins in Aqueous Solutions: Calorimetric, Viscometric, and NMR Spectroscopic Studies	https://www.doi.org/10.1021/acs.jced.7b00937
Density and Viscosity in Ternary d-Xylose + Ionic Liquid (1-Ethyl-3-methylimidazolium Bromide) + Water Solutions at 298.15 K:	https://www.doi.org/10.1021/je2013022
Studies on volumetric properties of some saccharides in aqueous potassium chloride solutions over temperature range (288.15 to 318.15) K:	https://www.doi.org/10.1016/j.jct.2008.11.009
Measurement and Modeling of Phase Equilibria in Systems Containing Water, Xylose, Furfural, and Acetic Acid:	https://www.doi.org/10.1021/acs.jced.9b00095
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Viscosities of Some Saccharides in Aqueous Solutions of Phosphate-Based Inorganic Salts:	https://www.doi.org/10.1021/acs.jced.5b00845
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Densities and Speeds of Sound of D(+)-Glucose, D(-)-Fructose, D(+)-Xylose and D(-)-Ribose in Aqueous Tripotassium Citrate Solutions at Different Temperatures:	https://www.doi.org/10.1021/acs.jced.5b00933

Crippen Method:	https://www.chemeo.com/doc/models/crippen_log10ws
Joback Method:	https://en.wikipedia.org/wiki/Joback_method
Influence of NH4Br on Solvation Behavior of Polyhydroxy Solutes in Aqueous Solutions at Different Temperatures and Atmospheric Pressure:	https://www.doi.org/10.1021/je500886a
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Osmotic properties of carbohydrate aqueous solutions:	https://www.doi.org/10.1016/j.fluid.2016.02.030
Densities, molar volumes, and isobaric expansivities of (D-xylose + hydrochloric acid + water) systems:	https://www.doi.org/10.1016/j.jct.2005.03.023
A quasi-ternary wet residue method applied to solid-liquid equilibrium systems:	https://www.doi.org/10.1016/j.fluid.2017.10.014
Conductivities of 1-alkyl-3-methylimidazolium chloride ionic liquids in monosaccharide + water solutions at 298.15 K:	https://www.doi.org/10.1016/j.fluid.2011.11.028
Solubilities of D-xylose in water + (acetic acid or propionic acid) mixtures at atmospheric pressure and different temperatures:	https://www.doi.org/10.1016/j.fluid.2012.07.014
Infinite Dilution Binary Diffusion Coefficients for Six Sugars at 0.1 MPa and Temperatures from (273.2 to 353.2) K:	https://www.doi.org/10.1021/je0601816
Salting-out effect of carbohydrates on the surface active ionic liquid 1-decyl-3-methylimidazolium bromide in aqueous solutions:	https://www.doi.org/10.1016/j.jct.2017.08.027
Solvation behavior of monosaccharides in aqueous protic ionic liquid solutions: Volumetric, calorimetric and NMR spectroscopic studies:	https://www.doi.org/10.1016/j.fluid.2016.03.016
Effect of sodium acetate on the volumetric behaviour of some mono-, di- and tri-saccharides in aqueous solutions over temperature range (288.15 to 318.15) K:	https://www.doi.org/10.1016/j.jct.2009.07.015
Vapor-liquid equilibrium in the ternary systems acetic acid + water + (xylose or glucose):	https://www.doi.org/10.1016/j.fluid.2018.06.011
Evaluation of the effect of ionic-liquids as soluting-out agents on the solubility of carbohydrates in aqueous solutions:	https://www.doi.org/10.1016/j.fluid.2017.12.006
Exploration of solute-solvent interactions in aqueous mixtures of monosaccharides and triammonium citrate (TAC) at different temperatures: Volumetric and acoustic approach:	https://www.doi.org/10.1016/j.jct.2019.105877
Phase Equilibrium Involving Xylose, Water, and Ethylene Glycol or 1,2-Propylene Glycol at Different Temperatures:	https://www.doi.org/10.1021/acs.jced.8b01128
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Viscometric studies on saccharides in aqueous magnesium chloride solutions at (288.15 to 318.15) K:	https://www.doi.org/10.1016/j.jct.2012.02.016
McGowan Method:	http://link.springer.com/article/10.1007/BF02311772
NIST Webbook:	http://webbook.nist.gov/cgi/cbook.cgi?ID=C58866&Units=SI
Densities and Viscosities of Polyhydroxy Solutes in Aqueous Tetraethylammonium Bromide Solutions at Different Temperatures:	https://www.doi.org/10.1021/acs.jced.5b00940

Legend

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
hsubt:	Enthalpy of sublimation 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
ss:	Solid phase molar entropy at standard conditions
tb:	Normal Boiling Point Temperature
tc:	Critical Temperature
tf:	Normal melting (fusion) point
vc:	Critical Volume