SOLUBILITY DATA FOR AQUEOUS SOLUTIONS

Table 1. Solubility of substances (solid, liquid, or gas) in pure water at 20 ºC and 100 kPa (i.e. mass concentration in the liquid phase, in equilibrium with the solute pure phase).

Substance	Formula(estate)	Solubility [kg/m^3 solution]
Solid solutes		
Ammonium chloride	$NH_4Cl(s)$	(297 g/kg solvent)
Ammonium nitrate	$NH_4NO_3(s)$	(1180 g/kg solvent)
Aspirin /Acetyl salicylic acid)	$HC_9H_7O_4(s)$	3.3
Baking soda	$NaHCO_3(s)$	100
Caustic soda	$NaOH(s)$	420
Washing soda (sodium carbonate hydrate)	$Na_2CO_3{\cdot}10H_2O(s)$	280
Sodium nitrate	$NaNO_3(s)$	(890 g/kg solvent)
Potassium nitrate	$KNO_3(s)$	(300 g/kg solvent)
Calcite	$CaCO_3(s)$	0.014
Calcium chloride	$CaCl_2(s)$	(750 g/kg solvent)
Potassium chlorate	$KClO_3(s)$	80
Potassium chloride	$KCl(s)$	(330 g/kg solvent)
Salt (sodium chloride)	$NaCl(s)$	(360 g/kg solvent)
Sugar (sucrose)	$C_{12}H_{22}O_{11}(s)$	790 (=1600 g/kg solvent)
Glucose	$C_6H_{12}O_6(s)$	570 (=890 g/kg solvent)
Liquid solutes		
Acetone	$C_3H_6O(l)$	miscible
Benzene	$C_6H_6(l)$	1.75
Cyclohexane	$C_6H_{12}(l)$	0.060
n-Butane	$C_4H_{10}(l)$	0.061
n-Pentane	$C_5H_{12}(l)$	0.040
n-Hexane	$C_6H_{14}(l)$	0.012
n-Heptane	$C_7H_{16}(l)$	0.006
Gaseous solutes*		
Acetylene	$C_2H_2(g)$	1.1
Ammonia	$NH_3(g)$	520 (560 g/kg solvent)
Argon	$Ar(g)$	0.060
Carbon dioxide	$CO_2(g)$	1.5
Carbon monoxide	$CO(g)$	0.028
Methane	$CH_4(g)$	0.020
Helium	$He(g)$	0.002
Hydrogen	$H_2(g)$	0.002
Hydrogen chloride	$HCl(g)$	82
Nitrogen	$N_2(g)$	0.019
di-Nitrogen oxide	$N_2O(g)$	2.2
Nitrogen monoxide	$NO(g)$	0.006
Oxygen	$O_2(g)$	0.043
Sulfur dioxide	$SO_2(g)$	100

*At 100 kPa (gas solubility is proportional to pressure in the ideal-solution limit; see table below).

Table 2. Gas solubility data in liquids and solids. The quotient $c_{i,liq}/c_{i,gas}$ or $c_{i,sol}/c_{i,gas}$ is presented, i.e. the so-called Ostwald solubility coefficient, K_{cc} (in mol/m^3 of solute in solution, per mol/m^3 of solute in its pure phase); other forms of Henry law constant are also in common use; e.g. $K_{\rho p}=K_{cc}M_i/(R_uT)$ (in kg/m^3 of solute in solution, per unit partial-pressure of solute in its pure phase; e.g. for CO_2 at 273, K_{cc}=1.8 implies $K_{\rho p}=K_{cc}M_i/(R_uT)=1.8\cdot0.044/(8.3\cdot273)=35\cdot10^{-6}$ (kg/m^3)/Pa=3.5 (kg/m^3)/bar).

Mixture	at 273 K	at 288 K	at 298 K	at 323 K
O_2(g) in H_2O(l)	0.044	0.036	0.032 (=23 ppm_mol/bar=1.3 (mol/m^3)/bar)	0.025
N_2(g) in H_2O(l)	0.027	0.018	0.015 (=11 ppm_mol/bar=0.60 (mol/m^3)/bar)	0.011
H_2(g) in H_2O(l)	0.024	0.021	0.019 (=14 ppm_mol/bar=0.77 (mol/m^3)/bar)	0.017
CO_2(g) in H_2O(l)	1.8	1.1	0.80 (=580 ppm_mol/bar=32 (mol/m^3)/bar)	0.50
CO(g) in H_2O(l)	0.03	0.026	0.23 (=170 ppm_mol/bar=9.2 (mol/m^3)/bar)	0.020
CH_4(g) in H_2O(l)	0.060	0.039	0.027 (=20 ppm_mol/bar=1.1 (mol/m^3)/bar)	0.024
C_2H_2(g) in H_2O(l)	1.9	1.1	0.99 (=730 ppm_mol/bar=40 (mol/m^3)/bar)	
NH_3(g) in H_2O(l)	1190	844	684 (=33%_mol/bar=28000 (mol/m^3)/bar)	370
N_2O(g) in H_2O(l)	1.3		0.567 (=410 ppm_mol/bar=23 (mol/m^3)/bar)	
H_2S(g) in H_2O(l)		3.0	2.5 (=1800 ppm_mol/bar=100 (mol/m^3)/bar)	1.8
O_2(g) in rubber			0.08	
N_2(g) in rubber			0.04	
H_2(g) in rubber			0.05	
CO_2(g) in rubber			1.0	
H_2(g) in polyethylene			0.04	
H_2(g) in nickel			0.22	

More detailed solubility data, and many other properties, can be found in Solution properties for some special solutions: salt-water, sugar-water, alcohol-water, hydrogen peroxide-water, ammonia-water and carbon dioxide-water.

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