

# The physical properties of the typical organic solvents <sup>1)</sup>

Organic Solvents	bp (°C)	mp (°C)	d (20/4°C)	Compatibility with Water (°C) (weight % of solvents)	Miscibility with Water <sup>b)</sup>
Methanol (MeOH)	64.5	-97.7	0.791	— <sup>a)</sup>	○
Ethanol (EtOH)	78.3	-114.5	0.789	78.2(96.0)	○
Propanol ( <i>n</i> -PrOH)	97.2	-126.2	0.804	87.7(71.7)	○
Isopropyl Alcohol ( <i>i</i> -PrOH)	82.2	-88.0	0.785	80.1(88.0)	○
Butanol (BuOH)	117.7	-88.6	0.810	92.7(57.5)	△
Isobutyl Alcohol ( <i>i</i> -BuOH)	107.9	-108	0.802	89.8(67)	△
<i>sec</i> -Butyl Alcohol ( <i>s</i> -BuOH)	99.5	-114.7	0.807	87.0(73.2)	△
<i>tert</i> -Butyl Alcohol ( <i>t</i> -BuOH)	82.3	25.6	0.781	79.7(88.2)	○
Ethylene Glycol	197.5	-12.6	1.114	— <sup>a)</sup>	○
1,2-Dimethoxyethane (Glyme)	84.5	-69	0.869	77.4(89.9)	○
Diethyl Ether (Et <sub>2</sub> O)	34.4	-116	0.714	34.2(98.7)	× <sup>c)</sup>
Diisopropyl Ether ( <i>i</i> -Pr <sub>2</sub> O)	68.5	-85.5	0.724	62.2(95.5)	×
Acetic Acid (AcOH)	117.9	16.7	1.050	— <sup>a)</sup>	○
Ethyl Acetate (AcOEt)	77.1	-83.6	0.901	70.4(91.5)	× <sup>c)</sup>
Acetic Anhydride (Ac <sub>2</sub> O)	140.0	-73.1	1.083		
Tetrahydrofuran (THF)	66.0	-108.4	0.889	63.4(93.3)	○
1,4-Dioxane	101.3	11.8	1.034	87.8(82)	○
Acetone	56.1	-94.7	0.790	— <sup>a)</sup>	○
Ethyl Methyl Ketone	79.6	-86.7	0.805	73.4(88.7)	△
Carbon Tetrachloride (CCl <sub>4</sub> )	76.6	-22.8	1.594	66(95.9)	×
Chloroform (CHCl <sub>3</sub> )	61.2	-63.5	1.489	56.1(97.8)	×
Dichloromethane (CH <sub>2</sub> Cl <sub>2</sub> )	39.6	-94.9	1.326	38.1(98.5)	×
1,2-Dichloroethane (ClCH <sub>2</sub> CH <sub>2</sub> Cl)	83.5	-35.7	1.252	72(91.8)	×
Benzene (C <sub>6</sub> H <sub>6</sub> )	80.1	5.5	0.879	69.3(91.2)	×
Toluene	110.6	-95.0	0.867	85(79.8)	×
<i>o</i> -Xylene	144.4	-25.2	0.880	93.5(50.1)	×
Cyclohexane	80.7	6.7	0.779	69.0(91)	×
Pentane	36.1	-129.7	0.626	34.6(98.6)	×
Hexane	68.7	-95.3	0.659	61.6(94.4)	×
Heptane	98.4	-90.6	0.684		×
Acetonitrile (CH <sub>3</sub> CN)	81.6	-43.8	0.782	76.7(84.2)	○
Nitromethane (CH <sub>3</sub> NO <sub>2</sub> )	101.2	-28.6	1.138	83.6(76.4)	×
Dimethylformamide (DMF)	153	-60.4	0.949	— <sup>a)</sup>	○
Hexamethylphosphoric Triamide (HMPA)	233	7.2	1.027		○
Triethylamine (Et <sub>3</sub> N)	89.6	-114.7	0.728		○
Pyridine (Py)	115.3	-41.6	0.983	93.6(58.7)	○
Dimethyl Sulfoxide (DMSO)	189.0	18.5	1.100	— <sup>a)</sup>	△
Carbon Disulfide (CS <sub>2</sub> )	46.2	-111.6	1.263	42.6(97.2)	×

a) It doesn't form azeotropic mixture

b) ○ : freely miscible

△ : partially miscible

× : practically immiscible (solubility : less than 1%)

c) highly soluble in water

## How to select recrystallization solvents

The crystals are obtained from the solution of single or more than one solvent.

In the two solvent system, solvent A and B should be miscible : when solubility is A > B, it is desirable that the boiling point is A < B and the density is A > B.