

Table 3.4 Some common extraction solvents.

Solvent	Dielectric* constant	Bp (°C)	Density (g mL ⁻¹)†	Flammability‡	Toxicity‡	Suitability
Pentane	1.8	36.1	0.63	+++	+	Poor solvent for polar compounds; easily dried
Toluene	2.4	110.6	0.87	++	+	Prone to emulsions
Diethyl ether	4.3	34.6	0.71	+++	+	Good general extraction solvent, especially for oxygen-containing compounds; dissolves up to 1.5% water. Prone to peroxide formation on storage
Ethyl acetate	6.0	77.1	0.89	+++	+	Good for polar compounds; absorbs a large amount of water
Dichloromethane	8.9	39.7	1.31	Non-flammable	++	Good general extraction solvent; easily dried, but slight tendency to emulsify
1-Butanol	17.5	117.7	0.81	++	+	'Last resort' for extraction of very polar compounds; dissolves up to 20% water

* Although the dielectric constant (ϵ) gives some indication of the polarity of a solvent, it does not always reflect a solvent's ability to dissolve polar organic compounds.

† Water = 1.0, saturated sodium chloride solution = 1.2.

‡+ = least flammable/toxic, +++ = most flammable/toxic.

Table 3.5 Some common drying agents for organic solutions.*

Drying agent	Capacity†	Speed	Efficiency	Applicability
Calcium chloride	High, 90%	Slow	Poor	Use only for hydrocarbons or halides; reacts with most oxygen- and nitrogen-containing compounds; may contain CaO (basic)
Calcium sulfate (Drierite®)	Low, 7%	Very fast	Very good	Generally useful; neutral
Magnesium sulfate	High, 100%	Fast	Good	Excellent general purpose drying agent; a weak Lewis acid; should not be used for very acid-sensitive compounds
Molecular sieves	Moderate, 20%	Fast	Good	When freshly activated, excellent for removing most of the water, but solutions should be predried with a higher capacity agent first
Potassium carbonate	Quite high	Quite fast	Quite good	Basic; reacts with acidic compounds; good for oxygen- and nitrogen-containing compounds
Sodium sulfate	High, 75%	Slow	Poor	Mild, generally useful, but less efficient than MgSO ₄

* These agents are for drying organic solutions, not for drying organic solvents. The drying of organic solvents is an entirely separate problem (see Appendix 2, p. 677).

† The number indicates the amount of water, as a percentage of its own weight, that a drying agent can take up.