9: Drying Solvents

A key aspect of Schlenk line chemistry is the purification and drying of organic solvents. Traditionally, this has been achieved through the use of solvent stills in which large volumes (>1 L) of solvent are refluxed over a suitable desiccant (typically alkali metals or metal hydrides) prior to distillation and collection. Solvent stills pose an enormous safety risk however, and therefore have been phased out of many synthetic laboratories, but are still occasionally used when necessary.

Solvent purification systems (SPS) are a safe and convenient solution for the purification and drying of organic solvents. Using inert gas pressure, the organic solvent is passed through a series of columns; one containing activated alumina to remove water and protic contaminants, and one containing a supported copper catalyst to remove trace oxygen. The solvent is first degassed by bubbling inert gas through the solvent reservoirs, however it may also be necessary to degas the solvent after collection using the freeze-pump-thaw method.

The use of activated molecular sieves alone has also been shown to be sufficient to dry a range of organic solvents. Water content can be quantitively measured using a Karl Fischer apparatus, or qualitatively assessed using the ketyl radical test.