FOR ADDITIONAL RESOURCES ON NITROGEN EVAPORATORS, INCLUDING USEFUL ARTICLES AND A LIST OF MANUFACTURERS, VISIT WWW.LABMANAGER.COM/EVAPORATORS

NITROGEN EVAPORATORS

MAKING SAMPLE CONCENTRATION EASIER AND GREENER

by Mike May, PhD

When a scientist needs to concentrate a sample that's in a volatile liquid—like acetone, acetonitrile, or methanol—a nitrogen evaporator can do the job. As a result, scientists use this technology in sample preparation in environmental, polymer science, quality control, and toxicology labs, plus others. Kelly Williams, product manager for nitrogen evaporators at Labconco (Kansas City, MO), says that nitrogen evaporators are typically used "to concentrate samples before analysis or to concentrate samples before a solvent exchange."

How a scientist uses a nitrogen evaporator depends largely on the industry, says David Oliva, sales and marketing manager at Organomation (Berlin, MA). "For example," he says, "our environmental laboratory customers might mainly use our equipment while conducting the 500-level EPA methods."

At Pharmacore (High Point, NC), senior director of GMP analytical chemistry Mark Shapiro says, "We use this technology to evaporate large quantities of solvent to do cleaning verifications." As a company that provides chemistry services—from custom organic synthesis to manufacturing of controlled substances—Shapiro and his team need efficient processes and instruments.

Tweaking the technology

A variety of changes keep improving nitrogen evaporators. As an example, Williams points out "advancements that have made nitrogen blowdown evaporation more convenient." These include the addition of a dry block heater instead of a water bath. The latter, says Williams, "requires maintenance and generates condensation, leading to cross contamination." In addition, she says that endpoint determination comes in handy with samples that cannot go to dryness but need to be concentrated to a specific volume for analysis. Williams says, "This frees end users up so they do not have to babysit their samples." Last, she adds that mechanical vortex motion or placing samples at an angle to create vortexing action in the sample increases the rate of evaporation by increasing the surface area.

Other advances in the technology also benefit many scientists. Oliva says, "In my opinion, the most interesting advance in laboratory evaporation as a whole is the ability to recapture solvent in an efficient manner." In part, state and federal regulations drive this advance, because today's laboratories must be more environmentally friendly. As an example, Oliva says that Organomation makes solvent evaporators "capable of up to 97 percent solvent recovery." He adds that these evaporators "for round-bottom flasks can be purchased with a nitrogen manifold option, which aids evaporations that will be going to dryness."

For nitrogen evaporators specifically, Oliva sees flexibility as the biggest advance. He says, "While some products in the laboratory space are increasingly specialized for a specific application, customers demand that nitrogen evaporators can be utilized in a broad range of applications." For example, some scientists want a device that works with different sample holders, such as vials or 96-well plates. That is available in existing devices.

For Pharmacore's needs, Shapiro says that his existing nitrogen evaporator "does everything we need. It has variable speeds and temperatures." If he could get an improvement, he'd like a valve on the nitrogen delivery line that slowly actuates once the lid is closed—instead of being completely open right away. For now, he and his colleagues just close the lid on the evaporator and slowly turn on the nitrogen by hand.

The breadth of use for nitrogen evaporators means that the devices must work in different conditions. That can require variations in the technology. For instance, Oliva says, "If the nitrogen evaporator is being used with harsh solvents, I would extremely recommend a unit with acid-resistant coatings." The right features and a little TLC can keep a nitrogen evaporator working for years.

Mike May is a freelance writer and editor living in Ohio. You may reach him at mike@techtyper.com.