

CHROMATOGRAPHY: WHAT'S NEW?

Frank Millard introduces the latest developments from the fast-moving chromatography sector

Chromatography products and services progress steadily according to need and available technology, neither of which stand still. A number of new products and services have recently joined the market.

Agilent Technologies has introduced a micro gas chromatograph. The new 990 Micro GC system is designed to monitor the safe distribution, calorific valuation and odorant level in natural gas to deliver lab-quality data whenever and wherever it is needed. The 990 Micro GC combines microfabrication and smart-connected digital technologies in a modular platform. The system's plug-and-play architecture and smart-connected user assist functions make the product easy to install, use and troubleshoot, reducing the cost of ownership and improving productivity.

In June, the company introduced the newest member of its LC/MS portfolio at the American Society for Mass Spectrometry Conference (ASMS) in Atlanta, Georgia. The new InfinityLab LC/MSD iQ system incorporates 'designed-in' smart features, software, and hardware developed specifically for chemists and chromatographers.

The InfinityLab LC/MSD iQ features intelligent instrument health monitoring. Embedded sensors gather and display data, allowing a quick assessment of the system's readiness, status and configuration. The instrument incorporates features such as a system suitability check that uses a test mixture designed to permit an overall assessment of the whole liquid chromatography-mass spectrometry (LC/MS) system before the collection of data. An early maintenance feedback feature enables lab managers to plan routine maintenance on the lab's schedule resulting in a focus on overall productivity.

The Agilent Infinity system



The Sciex Q-Trap system

Earlier this year Agilent also announced two new gas chromatography systems that incorporate innovative and intelligent 'self-aware' predictive technology, expanding its suite of smart-connected GC instruments. The Agilent 8890 and 8860 GC systems extend the company's portfolio of robust analytical instruments.

HYDROGEN GAS SOLUTION

Peak Scientific has introduced its latest hydrogen gas solution: Precision Hydrogen SL, its smallest and easiest to use hydrogen generator for GC-FID.

Precision SL was launched in September. Designed to supply hydrogen to flame detectors for gas chromatography, it is extremely compact, with a total footprint measuring less than 20% of the size of the existing Precision models. Available in both 100cc and 200cc and in black and white, Precision Hydrogen SL produces hydrogen gas at 99.9995% purity.

On June 3 the company unveiled its latest innovation at the 67th Annual ASMS Conference in Atlanta with the launch of the

compounds (acids, bases, neutrals), but especially for the analysis of polar basic compounds. The phase has demonstrated increased polar analyte retention, improved peak shape for troublesome basic analytes under typical reversed phase conditions, and a smart multi-modal interaction selectivity, making it a valuable tool for multi-compound and metabolite profile screens.

PROBLEM-SOLVING PRODUCTS

One problem Porvair Sciences addressed recently is solid phase extraction: it is releasing a new technology directed at the removal of phospholipids from samples prior to LCMS. This is being launched as Porvair Sciences Microlute PLR.

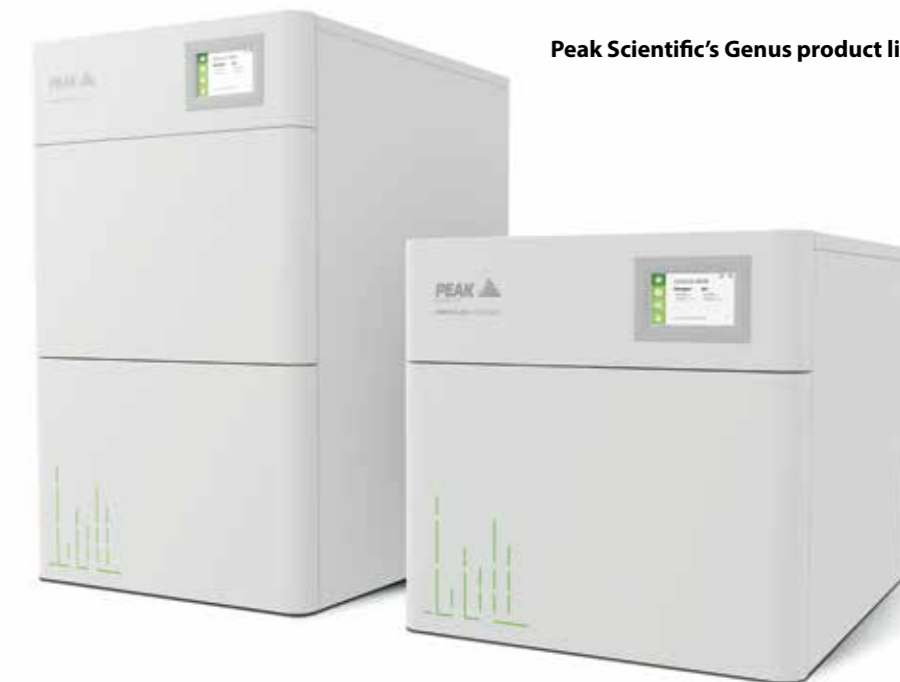
The company has developed a method of producing a composite material that incorporates the frit

from a traditional SPE system with the active chromatographic media to create a single plug. Therefore, the traditional SPE system of frit-media-frit is replaced with a single plug that contains the active media. While the media provides the same retention characteristics as the loose material, the composite method imparts a number of key benefits to the clear up of phospholipids.

Innovations from the company SRI include the H2-100 Hydrogen Generator. Many of the GCs the company ships now do not require any gas at all to operate because they are equipped with built-in hydrogen generators and air compressor. It makes GC quality hydrogen from distilled water and is perfect for labs that would prefer not to (or can't) include hydrogen cylinders.

In June SRI decided to discontinue the Model 420 GC. It will continue to provide support for its customers that use it. The company made the decision due to the development of the Model 310MM GC, which it has decided to be a much more viable choice for measuring cannabis while still being within a reasonable price range.

In March, Shimadzu released the Clam-2030 fully automated preparation module for LC-MS. This module automates everything from the



Peak Scientific's Genus product line

preparation of urine, blood and other biological samples to measurement via LC-MS. In only three to eight minutes, the Clam-2030 preparation module completes the blood sample's preparatory process, including the addition of reagents, mixing of the solution and the addition of a deproteinisation liquid – compared with the 15 to 20 minutes this process conventionally takes. Furthermore, if the samples and reagents

are placed and positioned in special containers for automatic conveyance to the LC-MS by an autosampler, the module can perform all of the processes automatically, on weekends and overnight.

Shimadzu also recently released the Nexgen GC multidimensional gas chromatograph, which achieves miniaturisation and high-speed analysis with "plate column" technology and multi-deans switch. It is a next generation GC, making it easy to use multidimensional analysis suitable for complex components by installing two gas chromatographs in a small body. The Nexgen GC has an installation area of about 30% less compared with conventional models, and cuts analysis time by half. Furthermore, it improves analytical productivity through high speed and space saving.

Shimadzu also announced the release of the Nexera Ultra High-Performance Liquid Chromatograph series, incorporating artificial intelligence as Analytical Intelligence, allowing systems to detect and resolve issues automatically. The Nexera series makes lab management simple by integrating IoT and device networking, enabling users to easily review instrument status, optimise resource allocation, and achieve higher throughput.

The Nexera UHPLC series maximises reliability and uptime with fully unattended workflows that span from startup to shut-down. Operators can set the system to start up at a specified time, so that it can complete auto-



Thermo Scientific's latest solution



Porvair has launched a new microlute solution



Sciex offers a range of chromatography solutions



purge, equilibration, baseline checks and system suitability in advance, and be ready for analysis before they arrive at the lab. In addition, FlowPilot ramps up the flow rate gradually, reducing the possibility of damage to columns. The Nexera also has auto-diagnostics and auto-recovery capabilities that allow it to monitor pressure fluctuations to check for anomalies.

OPTIMISING SYSTEMS

Testa Analytical Solutions has now started offering optimised versions of its Differential Refractive Index (DRI) Detector under OEM contract to enhance the performance of both HPLC and GPC/SEC systems.

The company's compact DRI Detector and DRI Detector Kits offer a wide range of options in terms of light source,

electronics and firmware solutions. This means they can be readily adapted to fit the requirements of any third -arty HPLC or GPC/SEC system. Operating from room temperature up to 80°C with high thermal stability, the DRI detector also offers excellent baseline stability and fast setting.

A new validated ion chromatography tandem mass spectrometry (IC-MS/MS) analytical workflow was launched by Thermo Scientific in November, designed to enable food testing laboratories to overcome the challenges associated with liquid chromatography tandem mass spectrometry (LC-MS/MS) analysis of polar anionic pesticides in complex sample matrices.

The Anionic Pesticides Explorer is a high-throughput, sample-to-result, IC-MS/MS-based analytical workflow,

comprised of the Dionex Integriion High Performance Ion Chromatography system coupled with the TSQ Altis Triple Quadrupole MS, for the multi-residue detection, identification and quantification of anionic pesticides at low concentrations in complex food matrices.

Announced in March, Thermo Scientific's Dioxin Analyser offers cost-effective determination of harmful contaminants as required by European regulation. A new workflow addresses the high cost and complexity faced by scientists testing food and animal feeds for low levels of dioxins and 'dioxin-like' polychlorinated biphenyls (dl-PCBs).

The analyser includes the Thermo Scientific Triple Quadrupole TSQ 9000 GC-MS/MS system equipped with an advanced ionisation source (AEI) designed for enhanced sensitivity, and a range of productivity tools to deliver reliable and cost-effective routine analyses.

Finally, Waters launched its Acquity Arc Bio System in 2018, which is described as a versatile, iron-free, bio-inert, quaternary liquid chromatograph specifically engineered to enable the efficient transfer and improvement of bioseparation analytical methods regardless of the LC platform on which the original method was developed.

The original system was launched in 2015. The company says that the Arc platform can create robust and reliable methods that can be transferred easily from lab-to-lab and from one LC instrument platform to another without compromising method integrity. ●

