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MEINHARD®

NEW PRODUCTS

High-Purity Quartz Nebulizer Lowers Background in ICPMS

The elemental background or apparent blank is sometimes limiting in ultratrace analysis by ICPMS. For years, Meinhard has offered the TQ-series of quartz concentric nebulizers, which considerably reduce background compared to borosilicate glass, not just for boron, but for alkalis and alkaline earths as well.

The new TQH-series is manufactured from the highest purity quartz available. Consequently, the nebulizer contribution to background levels is reduced by factors of 10 to 100 for most elements, compared to the TQ-series.

The TQH-series of high purity quartz nebulizers start at $425, and are currently available in the A-type nozzle most commonly used in ICPMS. The TQ-series is available in the A-type nozzle for $365, and in C- and K-type nozzles for $520.

High Pressure Asher Vessels

These 50 mL quartz reaction vessels are a direct replacement for those used in the Anton Paar / Perkin Elmer High Pressure Asher, and are provided at a substantial cost savings. ML132514 is offered at $149 each with a discount of 10% on orders of six or more. ML132515 is the matching lid, offered at $49 each with a 10% discount on orders of six or more.

High-pressure ashing is one of the more popular sample preparation techniques, though it could be more accurately described as wet chemical pressure decomposition, a technique that has been around for more than 150 years. The sealed vessel technique makes it possible to get excellent recoveries even for volatile elements like Hg, As, and Se. The 50 mL vessels are most common and are routinely used for sample sizes up to 0.8 g. Contact us if you require a different size.

Reference Materials for Heavy Metals in Plastic

European Community WEEE/RoHS directives have defined specific limits for heavy metals in plastic. Sets of polyethylene (PE) and polyvinyl chloride (PVC) have been created for screening of heavy metals by XRF to ensure compliance with these limits. Analytical Reference Materials International (ARMI) offers PE and PVC materials having good homogeneity and containing Br, Hg, Cr, Pb, and Cd. Shown at left are concentrations in PE; the PVC set has similar concentrations.

	PE-High	**PE-Low**	**PE-Blank**
Element	Conc. (mg/kg)	Conc. (mg/kg)	Conc. (mg/kg)
Br	1095	499	ND
Hg	1094	203	ND
Cr	998	398	ND
Pb	1202	400	ND
Cd	303	100	ND

These reference materials are available in sets of three individual discs, each of which is 31 mm in diameter and approximately 13 mm thick. The overall error of concentration of the added element is estimated at less than 4% relative at a 95% confidence level, except for those below 100 mg/kg where the estimated error is 5 mg/kg absolute at a 95% confidence level.

Contact ARMI at 303.216.2649 or sales@armi.com for more information.

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ICPMS Service Organization

Ionflight provides a complete service solution for your VG / Thermo PlasmaQuad ICPMS. If it's a technical question, a parts order, or a service call, you will receive prompt, affordable, and personalized service. Ionflight is now the preferred service vendor for nearly all of the PQ ICPMS users in the US and has clients in Asia and Europe, as well. Ionflight has a long list of completely satisfied clients who have saved money and productivity by using their service. Ionflight provides on-site instrument repair, technical support, tailored service contracts, installation, and training, upgrades, along with parts repair and exchange. For further information, call 617.948.2984, email info@ionflight.com, or visit www.ionflight.com.

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Thinking about a Direct Injection Nebulizer?

They solve or minimize some problems, but they are not easy to make and require care in setup and operation. There have been several on the market, but by far the most popular and cost-effective is Meinhard's Direct Injection High Efficiency Nebulizer (DIHEN). What can it do for you?

The primary advantage of direct injection is that 100% of the sample is delivered to the ICP plasma. As a result, interferences that occur in the spray chamber are nearly eliminated. Moreover, the analysis of microvolume samples is enhanced as none of the sample goes to waste. Another advantage of the DIHEN is that the washout time, even for notorious elements like B and Hg, is dramatically reduced.

Research has shown that quite a few interferences originate in the spray chamber. For example, the desolvation of the aerosol begins in the spray chamber, but different chemical species of the same element desolvate at different rates. The species that desolvates fastest will yield smaller droplets that are preferentially transported to the plasma. A spray chamber that is heated to enhance desolvation can actually exacerbate this problem.

When the aerosol enters the spray chamber, the droplet solvent composition tries to equilibrate with liquid on the walls of the spray chamber. To minimize this potential interference, all sample, standard, and rinse solutions should have the same acid composition and concentration. If they do not, it may take several minutes to achieve a stable signal while the aerosol equilibrates – primarily by washing the walls with the current solution. In general, the spray chamber surface area should be minimized, and waste should be drained away as quickly as possible. Controlling the temperature of the spray chamber, especially by cooling, can be helpful, too.

A more obvious problem occurs when some of the analyte of interest goes into the vapor phase while some remains as a liquid droplet. Typically, more than 90% of vapor is transported to the plasma, while only about 5% of the droplets are. This is a significant problem in the analysis of organic solvent solutions where, for example, organo-sulfur compounds can exist as both volatile small molecules and non-volatile large molecules. Calibration standards have to behave exactly like your analytes in order to allow reliable analyses. Mass transport to the plasma has to be controlled – usually by the nebulizer.

One very effective approach to the elimination of spray chamber interferences is to eliminate the spray chamber: use a direct injection nebulizer.

In 1994, Meinhard introduced the High Efficiency Nebulizer (HEN), a microconcentric nebulizer having a very small liquid capillary and a very small gas annulus (jet). Where the mean droplet size from a typical nebulizer is in the 10 – 15 um range, the mean aqueous aerosol droplet diameter from a HEN is 1 – 3 um – and more than 80% is normally transported. However, this does not eliminate the spray chamber.

In 1998, working in collaboration with Montaser's group at George Washington University, Meinhard introduced the DIHEN as a commercial product. Since then, the DIHEN has been found to be particularly useful for the analysis of petroleum products, for reducing washout time, and for reducing the mass-fractionation problem in the measurement of isotope ratios via ICPMS.

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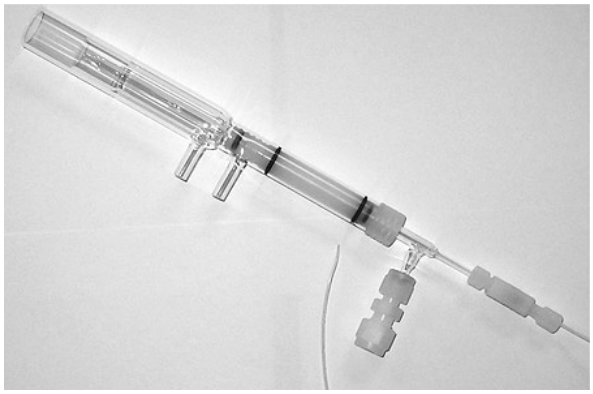
Continued from page 2

It has also found considerable acceptance for coupling liquid chromatography and capillary electrophoresis to an ICPMS for element selective detection. At normal liquid flow rates, the analysis of microvolume samples is straightforward, though flow injection apparatus can be helpful.

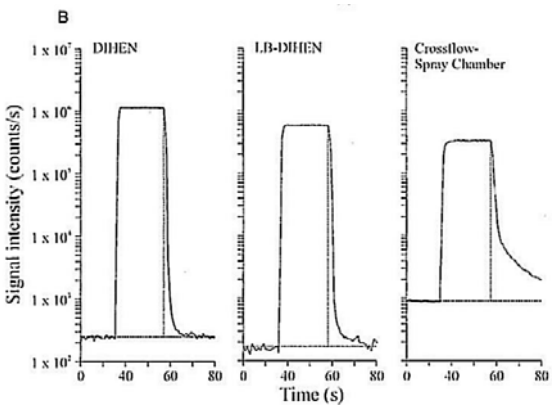
A typical DIHEN-170-A0.3 is normally operated at 0.2 – 0.4 L/min of argon, which requires about 30– 50 psi. Under those conditions, the DIHEN will naturally aspirate solution at 50 – 100 µL/min. In general, the optimum sample flow is 40 – 60 µL/min, all of which reaches the plasma. It is best to maintain the flow rate using a properly sized pump.

Meinhard can supply all of the components you need with the DIHEN. Shown at right (top) are a Finnigan Type CD torch, the DIHEN adapter, the DIHEN, Fit Kit 1 (0.7 mm i.d. Tefzel tubing), and Fit Kit 2 (a modified union to facilitate the argon connection). Assembly and installation on the Element II are simple tasks.

The DIHEN is also available in a Large Bore version, which has a much larger solution capillary that is more typical of a conventional concentric nebulizer. While it may be less prone to clogging, the larger solution capillary i.d. of the LB-DIHEN contributes to an increased washout time compared to the DIHEN, as shown in the figure at right (bottom). For the standard DIHEN, the boron signal decreased by 3.5 orders of magnitude to the baseline level in approximately 10 seconds. The LB-DIHEN yields almost the same sensitivity, but requires nearly 20 seconds for boron to wash out.



Both yield better sensitivity and wash out much faster than the conventional crossflow nebulizer/double pass spray chamber, which requires several minutes to recover the baseline.



Starting at $2000, Meinhard's DIHEN may be the key to better analyses and more productivity. We will be pleased to help you get the most out of sample introduction system; just give us a call.

Taken in part from a presentation at the Omaha Workshop on Magnetic Sector Field ICPMS. If you would like a copy of the presentation, please contact us.

Meinhard Sponsors Student Poster Awards at FACSS

At the 32nd Annual FACSS and 51st ICASS this month, Meinhard Glass Products sponsored two awards for the best poster presentation by a student. In addition to a stipend, Meinhard gave each student a membership in the Society for Applied Spectroscopy, the leading international organization of chemists and spectroscopists, and a charter member of FACSS. This year, the Canadian International Conference on Analytical Sciences and Spectroscopy met jointly with the Federation of Analytical Chemistry and Spectroscopy Societies at the Centre des Congres de Quebec in Quebec City.

Upcoming Conferences and Exhibits

The 2006 Winter Conference on Plasma Spectrochemistry will be held in Tucson, Arizona, January 8 – 14, 2006.

Pittcon 2006 will be held in Orlando, Florida, March 12 – 17, 2006.

In October 2005, Meinhard will be represented at The Science and Technology in Thailand Conference and the International Beijing Conference & Exhibition on Instrumental Analysis (BCEIA 2005).

Meinhard Glass Products

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INSIDE THIS ISSUE!

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- ☐ ALCAN **Aluminum** Catalog

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