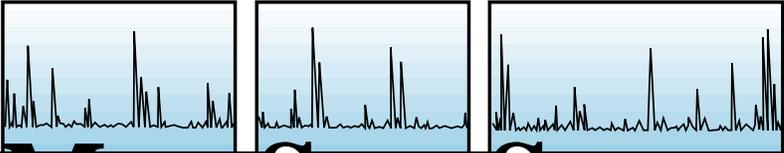


The  **Mass Spec Source**

VOL. XVI, NO. 2 SEPTEMBER 1993

For Users of Mass Spectrometers and Gas Chromatographs

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**SIS
at
ASMS**



The 1993 ASMS meeting in San Francisco was a big success for the more than 2200 scientists who attended. Four members of our staff were at the meeting from Saturday until its end on Friday. During this week we attended the H.P. Users Meeting, attended the ASMS technical sessions, toured the Varian GC/Saturn Production facilities and met many of our customers at our hospitality suite.

Our second annual hospitality suite which once again featured our "Make your Own Ice Cream Sundae" was a big success. We estimate that we served more than 1200 sundaes over the first three days of the meeting. We enjoyed talking to many of you, getting your feedback, discussing the challenges that you encounter and trying to help you to solve problems through our technical experience and products that we design, manufacture and market to the scientific market.

We discussed with many of you ways that we can better serve you. Since we are a small company we are geared to better serve the individual customer. Our products can be custom modified for your particular requirements. We solicited feedback on ways that we can make this newsletter better and more informative. Some of these new ideas have already been incorporated in this latest edition of the Mass Spec Source. We encourage you to contact us if you have additional ideas for this newsletter, would like to contribute to its content or would like to suggest additional products or services that you think we should provide.

In addition to meeting many of you at our hospitality suite, our staff also attended the technical sessions in order to keep abreast of new developments in the mass spec markets as well as to present papers on some of our research. Chris Baker presented a poster on the new Direct and DEP Probes we have developed for the H.P. Engine mass spec and Sandy Overton presented a paper on the analysis of Honey flavors using our Short Path Thermal Desorption System. We also presented three different posters at the manufacturer's poster session.

At our hospitality suite we also demonstrated our complete line of mass spectrometer probes and our Short Path Thermal Desorption System and discussed the applications of these systems with many of you. Dr. Robert Rosen and the staff from CAFT/Rutgers University put together a review article on both the technical and social program at ASMS. This article is on page 5 in this newsletter. We want to thank Bob for this excellent review of ASMS and the personal touch he incorporated into the article. *continued on page 3*

FOR SALE

FROM SCIENTIFIC INSTRUMENT SERVICES

For Sale - HP 5987/5880 with positive and negative CI, extended mass range ($m/z = 2000$). DIP and Phrasor FAB gun. RTE-6 data system with two HP150 terminals, one Thinkjet and one Deskjet. This instrument has been under continual service contract since purchase. Asking 40K. Pete Wishnok, Room 56-313, Division of Toxicology, MIT, Cambridge, MA 02139, 617-253-6795 FAX 617-258-8676.

For Sale - Alcatel ZM2002 Vacuum Pump from H.P. 5971 MSD. Like new - used only one month by S.I.S., when it was replaced by a larger pump. Call Tony at S.I.S. 908-788-5550, Stock # ALC-2002, **Price \$500.00**

For Sale - Edward E2M2 for H.P. 5971 MSD. Brand NEW - Never used. Was replaced with a larger vacuum pump when the MSD was installed. Call Tony at S.I.S. 908-788-5550, Stock # EDW-E2M2, **Price \$550.00**

For Sale - March Plasmod Plasma Etcher. Table top plasma chemistry reactor designed to provide plasma chemistry reaction for plasma etching and cleaning. This unit was purchased by S.I.S. several years ago to develop a method to reactivate electron multipliers by cleaning

via chemical etching. The market never developed for this technique. Maybe someone has an application for this unit. Unit only used about 10 hours. Consists of RF Power module and the Plasmod Pyrex Reaction Chamber. Vacuum pump not included (can use one of the two pumps above). **New cost \$6000.00, Price \$2000.00** Call Tony at S.I.S. 908-788-5550, Stock # PLASMOD.

Discontinued S.I.S. Inventory For Sale.

The following items have been discontinued in the S.I.S. catalog but stock is still in our warehouse. All items are NEW but quantities are limited.

Dahle 18" Paper Cutter, Model 118. Table size 26" x 20", 1/2" grid pattern on table, self sharpening 18" knife blade. Part # DA118, **List Price \$126.95, Now \$55.00**

Dahle 12" Paper Cutter, Model 112. Table size 20" x 14", 1/2" grid pattern on table, self sharpening 12" knife blade. Part #DA112, **List Price \$64.95, Now \$33.00**

No. 6222 Acculight Lightbox/Viewer - 24"W x 18" D Tabletop lightbox, 110VAC. Constructed of heavy gauge steel and standard 5000K light source. **List Price \$258.00, Now \$125.00**

Luxo No. L16210 Crownlight, Adjustable

lamp with 4 way mounting bracket, 36" adjustable spring tensioned flexible arm. Available in white and black. **List Price \$29.95, Now \$15.00**

Luxo No. L16211 Lightmax. Adjustable 38" spring tensioned adjustable arm, high impact nylon shade. Available in white only. 4 way mounting bracket. **List Price \$39.95, Now \$18.00**

Luxo No. L16159 Exhaust Fan Lamp. The exhaust fan clears an immediate working area of potentially hazardous toxic fumes. Simultaneously it illuminates the task with a 22 watt fluorescent circle light source. Gray only. **List Price \$226.00, Now \$110.00**

Terms and Conditions

Scientific Instrument Services (S.I.S.) continues to supply "The Mass Spec Source" newsletter as a service to our customers. Printed six times a year, it includes articles and notes on new products and procedures of interest to mass spec and GC users. Papers from all fields of scientific inquiry in which mass spectrometry and gas chromatography can play a role will be considered and subject to review. However, S.I.S. reserves the right to reject any article that is in direct competition with S.I.S. products.

Articles and Application Notes

Editorials and reviews on new instrumentation and techniques for GC/MS will be considered for publication. These articles can be any length and our Graphics Department will aid you in any way you may need.

All articles and application notes in this publication are reviewed by two peer reviewers from the mass spectrometer community.

Mass Spec Tips

Any new ideas or tips that could benefit other mass spectroscopists can be submitted for inclusion in this section. Authors will be compensated \$50.00 for each tip published in this newsletter. For each article or tip submitted, the authors name will be included in a yearly drawing at ASMS for a "free color TV" or gift certificate.

For Sale/Wanted

We advertise, for those looking to sell or buy, various mass spectrometers, leak detectors, gas chromatographs or other instrument parts. These parts may be new, used or reconditioned. Items are listed as described by the seller. If you wish to sell any mass spec parts or if you are looking for some particular part, please call Sandy Overton, editor (908) 788-5550. Be prepared to describe the item fully and indicate prices.

Laboratory Cartoons

S.I.S. will pay you for original cartoons related to the laboratory or GC/MS. We will consider cartoons related to GC/MS or any laboratory situation. Authors of cartoons printed in the Mass Spec Source will be paid \$50.00 for their contribution. Our Graphics department can aid you with illustrations.

For More Information

Anyone interested in writing in any of the areas above should contact Sandy Overton, the editor of the Mass Spec Source, at (908) 788-5550. We are always trying to improve

this newsletter, if you have any suggestions please give us a call. Thanks for your continued support.

Warranty

S.I.S. does not warranty that the items described herein are usable or fit for a particular purpose. Our company makes no representation as to condition or character of the merchandise. S.I.S. will not be responsible for consequential or special damages.

"The Mass Spec Source"

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Once again we thank you for stopping by to see us at the San Francisco ASMS meeting and we look forward to seeing you next year in Chicago where we will once again offer our "Make Your Own Ice Cream Sundae Hospitality Suite."

New Mass Spectrometer Probes Under Development



During the last year we have spent a great deal of time and effort, designing and producing a wide range of mass spectrometer probes, including direct probes, DEP probes, FAB and continuous flow FAB probes, thermospray and calibration probes. We presented a paper on these products during the technical poster session at ASMS and displayed these probes at our hospitality suite.

We also showed the first prototype of our new Autoprobe sample introduction probe during this meeting. This first prototype was just finished and tested on a H.P. Engine mass spectrometer just one week before the ASMS meeting. This automated probe permits the unattended introduction of probe samples (both direct and DEP probes) into the mass spectrometer. A microprocessor controls the sequence of valve opening and probe introduction into the mass spectrometer resulting in increased sample handling speed, reproducible sample analysis and elimination of mass spectrometer venting. The next version of this system with an auto sampler attached to the autoprobe is planned to be introduced and marketed at Pitt Con next year.

Also shown for the first time at the ASMS meeting was a working prototype of a direct probe for the H.P. 5971/5972 mass spectrometer. This new probe attaches to the MSD via the GC inlet port. The GC must be removed for its operation and replaced with the valve inlet system. Additional features of this probe are still being developed including an independent MSD source heater. We also hope to have this new product ready for Pitt Con next year.

We were glad to share with many of you these prototype versions of new products

under development and get your feedback on ways to make them better or modify them for your particular requirements. As always we continue to expand and develop new products based on your feedback and system requirements. While many other companies are curtailing their research and development expenses during this current economic recession, S.I.S. is expanding our efforts to design, manufacture and market many new products for the mass spectrometer, gas chromatograph and liquid chromatograph product lines. Stay tuned to see many of these NEW products as they are introduced in this newsletter over the next year.

New Format for the "Mass Spec Source"

As can be readily seen we are changing the format for this newsletter. Some of these ideas were discussed or suggested by some of you at the ASMS meeting. The first change is a newly designed cover. Our Graphic Arts Manager, Allen Singer, is responsible for this new cover as well as the overall design of the newsletter and our other advertising materials. Many of you suggested that the newsletter come out more frequently. This newsletter requires a great deal of time and effort to produce but beginning with this edition the frequency will be increased to 6 times per year (every two months). The newsletter will be reduced in size to about 16 pages, all outside advertising will be eliminated (all products listed will be available from S.I.S.), and duplication of pages will not occur within one years editions. Sections such as "Independent Servicemen" will only be published once per year.

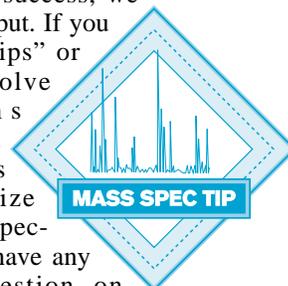
Several new sections are planned and we are open to additional new sections or features based on your input. There will still be at least one feature article per edition as well as the "New Products" section. Additional ideas which were suggested and we anticipate will appear in future editions include a Restaurant Review for the next ASMS meeting, Humorous Anecdotes from the Mass Spec Lab, Leaders in Mass Spec, Suggestions on the Use of Independent Servicemen and a Question and Answer Forum on Mass Spectrometers.

If you have any further suggestions or comments about the content or format of this newsletter we would be glad to hear from you.

New Section - "Mass Spec Tips"

The first new section which was suggested by our customers at ASMS is called "Mass Spec Tips". It is anticipated that this new section will be in every edition of this newsletter. We are quite excited about this new addition to our newsletter. It is meant to be a forum for the exchange of ideas, tips or other problem solving solutions for the mass spectrometer community. In order for this to be a success, we

need your input. If you have any "tips" or ideas to solve problems which could help others better utilize their mass spectrometer or have any other suggestion on either mass spec hardware, software or operation please give us a call or drop us a line so that we can include your input in the next edition of the "Mass Spec Tips". We know that there are many techniques, methods and solutions to particular problems that many of you are using that maybe you feel weren't worthy of publication. Other mass spec users may face the same problem and your solution can help. So now is your chance to pass along these ideas to the mass spectrometer community. Authors names and affiliations are optional at your discretion.



In addition, authors of "Mass Spec Tips" will receive \$50.00 for each tip published in this newsletter. We will also be selecting one person each year at the ASMS meeting from the contributors to both the "Mass Spec Tips" section and the feature articles to receive a free 17" color TV or gift certificate. For each tip or article which is published between consecutive ASMS meetings, the author will receive one chance on this yearly drawing.

Thank you for your continued support.

John J. Manura
President, S.I.S.

WORKSHOPS

at the 1993 Eastern Analytical Symposium

November 15-19, 1993 Somerset, NJ

Scientific Instrument Services is chairing two workshops at the 1993 Eastern Analytical Symposium in Somerset, NJ on November 15-19, 1993. We have put together a group of speakers for these workshops to develop a program that will be both

informative and educational for all who attend. If you are interested in attending either one of these half day workshops, please register through the Eastern Analytical Symposium registration or contact Terry at S.I.S. (908)-788-5550.

Mass Spectrometer Inlet Techniques: Recent Advances

Chairman: Christopher Baker,
Scientific Instrument Services

Time: Wednesday Afternoon,
November 17, 1993

This symposium is designed to be an informative series of presentations on the latest advancements on mass spectrometer inlet techniques particularly in the areas of Liquid Chromatography (LC), Capillary Electrophoresis (CE) and Fast Atom Bombardment (FAB). Lectures are being presented by the companies and individuals responsible for recent advances in these techniques.

1. **"Recent Advances of LC/MS and CE/MS on a Benchtop Ion Trap Using Atmospheric Pressure Ionization"** Jack Henion, A. Morehai, H.K. Lim, and J. Cai, Drug Testing and Toxicology, NYS School of Veterinary Medicine, Cornell University, Ithaca, NY.
2. **"Routine High Flow LC/MS Using New Atmospheric Pressure Ionization Technology"**, C.S. Campbell, Finnigan MAT, San Jose, CA.
3. **"Continuous Flow Fast Atom Bombardment Mass Spectrometry (CF-FAB/MS) With and Without the Addition of Matrix"**, Robert Dilliplane, Rohm and Haas Company, Spring House, PA.
4. **"A Review of Ionization Mechanisms in Thermospray-Mass Spectrometry"** Richard D. Hiserodt and Robert T. Rosen, Center for Advanced Food Technology, Rutgers University, New Brunswick, NJ
5. **"Simplified Automated Sample Introduction into the Mass Spectrometer"** Hewlett Packard Co., Paramus, NJ
6. **"LC/MS Techniques: Expanding Every Day"**, Brian Musselman, JEOL USA, Inc., Peabody, MA.

GC Introduction Techniques - Thermal Desorption

Chairman: John J. Manura,
Scientific Instrument Services

Time: Thursday Morning,
November 18, 1993

This series of lectures is designed to be an instructional and educational program to aid the GC or GC/MS user with the application of Thermal Desorption Techniques. Topics will be covered such as the use and selection of adsorbent resins; environmental, food science, forensic and other applications; and techniques such as purge and trap, air testing and direct thermal extraction.

1. **"Introduction to Thermal Desorption - Selection and Use of Adsorbent Resins for Thermal Desorption Applications"**, John J. Manura, Scientific Instrument Services, Inc., Ringoes, NJ.
2. **"Use of Multibed Adsorbent Traps" and GC System Considerations for Thermal Desorption"** Scott Hazard, Supelco, Bellefonte, PA.
3. **"Methods and Techniques for Quantification Using Thermal Desorption"**, Thomas Hartman, CAFT, Rutgers University, New Brunswick, NJ.
4. **"Optimization of Methods TO-1 and TO-2 for Ambient Air Analysis"**, Valerie Naughton, Tekmar, Cincinnati, OH.
5. **"Thermal Desorption Applications and Techniques Using Adsorbent Resins"**, Santford Overton, Scientific Instrument Services, Inc., Ringoes, NJ.
6. **"Direct Thermal Extraction Using Thermal Desorption - Extraction and Analysis Without the Use of Solvents"**, John J. Manura, Scientific Instrument Services, Inc., Ringoes, NJ.

Overview of the 1993 American Society for Mass Spectrometry Annual Meeting, San Francisco, California

Robert T. Rosen, Joseph Lech, Elaine K. Fukuda, Richard Hiserodt and Thomas G. Hartman

Center for Advanced Food Technology,
Mass Spectrometry Facility
Cook Campus, Rutgers University,
New Brunswick, New Jersey 08903

This years ASMS meeting was, we believe, among one of the best for gathering information, especially if you were interested in liquid chromatography-mass spectrometry and laser desorption as related to biomolecules. Papers related to the introduction techniques of electrospray ionization (ESI) and atmospheric pressure chemical ionization (APCI) for MS seemed to prevail. There is no doubt other techniques such as those involving CI-MS, fast atom bombardment (FAB)- and liquid secondary ion-MS (LSIMS) were of extreme value, but the majority of papers focussed on LC-MS and the instrumental advances of the last year.

First some comments about San Francisco. The weather was nice, the hotel great and Fisherman's Wharf and Giardelli Square wonderful. The rides on the cable cars were entertaining and the restaurants the best. To those of you who believe you are observant scientists, I hope you noticed the continuing "Con Game" that was going on in the city and down by the wharf. This "game" was prevalent, even at the ASMS meeting. This game was not necessarily to take you for money but rather to score "points" in an ongoing intercity challenge. There will be more on this later in the article, but we hope we have tweaked your interest enough so you will read on.

The Labor day weekend started with the usual user meetings, sponsored by the manufacturers as well as with ASMS sponsored short courses. These short courses are valuable to the membership, and I'm sure that the profits help in keeping dues low. The users meetings are also very useful. While some think of these user meetings as hype by the manufacturers, we have always learned valuable information at these, and had some immediate questions answered

with direct questions to either the scientists who work for the companies or others who use the same piece of equipment. Sunday evening was the usual ASMS reception. It's always good to see old friends and acquaintances that we haven't seen in a year. Every year there seems to be more and more younger people in the field, a sign the society is healthy and growing, and also a sign that we are getting older.

This years format for the meeting was quite different. There were talks from 8:30 AM to 12:30 PM. The posters were up all

"To those of you who believe you are observant scientists, I hope you noticed the continuing "Con Game" that was going on in the city and down by the wharf"

day, but the authors were present in the afternoon. Talks resumed at 4 PM and lasted until about 6 PM. This worked well with one or two exceptions. There were too many people in the afternoon in the posters, with too little space between the aisles. The posters were great however, with the quality being (again in our estimation) better than many of the oral presentations. The ability to ask personal questions to the author in a one to one (or two or four) situation leads to a great exchange of information with the ability to ask directed and point blank questions, perhaps of concern to no one but you. Supper followed, with hospitality suites starting at about 5:30 or 6 pm. Right after supper followed the workshops, going from 8 to 10 PM. These are as important a learning experience as any other aspect of

the meeting, with the only problem deciding which simultaneous group to attend. After going from early morning to late evening, we were all very tired, especially after a few days steady of this "grueling" pace. Still there was time to attend one or two of the hospitality suites for an ice cream or a nightcap (or both) and to have some more direct discussions with colleagues. These hospitality suites are not to be belittled nor the scientific benefit minimized. There is much exchange of information during these informal sessions and much can be learned by socializing. It is believed that without the benefits of the hospitality suites, even more so than the workshops, much less would be gained from this meeting.

The first plenary lecture was by Jay Davis, from Lawrence Livermore Labs, discussing accelerator mass spectrometry. This technique uses an accelerator in conjunction with a mass spectrometer for isotope ratio analysis. While about 2000 people attended this lecture not all have use for this technique. There are only several of these instruments in the world. The highly sensitive and precise technique is used, for example, in precise radiodating, and in adulteration studies. In Food Chemistry, the technique has been used to determine adulteration in natural vanillin, where synthetics prepared from petroleum based chemicals have little or no ^{14}C . This is important as the cost of the natural product may be 100X that of the synthetic. Sessions following the plenary lecture included Spray Ionization, Fast Chromatography/Mass Spectrometry, Accelerator MS and Distonic Ions. Fast chromatography is important to those labs doing quantitation, so as to speed up the work to increase throughput. The hotter the temperature of a capillary GC column, for example, the sooner a peak of interest will elute. If this component elutes

with perhaps a two or three second peak width and the analysis is performed in the scanning mode, then only 2 or 3 scans can be obtained at a scan rate of a second. This is not enough points to adequately define a peak so that the peak top can always be determined. Speeding up the scan rate to 0.3 seconds, hurts sensitivity in that the ions of interest are focussed on the multiplier for less time. The symposium on Fast Chromatography addressed those issues.

Electrospray is a wonderful new LC/MS technique for the determination of polars in solution. While the term polar is indeed relative, here it applies to very polar species such as acids, amines and those species that if not ionized in solution, can be ionized with the addition of acid or base. This technique may only partially overlap that which can be accomplished by thermospray (TSP) LC/MS or Atmospheric Pressure Chemical Ionization (APCI). In these latter two techniques, ionization is based on Bronsted Acid/Base equilibria in the gas phase rather than in solution as per electrospray. In TSP or APCI, the solvent, most specifically when using a filament or discharge electrode, becomes the chemical ionization gas or the proton donor. Good proton accepting groups include secondary and tertiary amines, carbonyls from esters, ketones and the like. While polar in nature, these functionalities are indeed relatively much less polar than strong acids and bases. But needless to say, electrospray may be the most important technique in bioanalytical chemistry. The main disadvantage to date has been the low flow rates utilized, in the range of 5 to 50 μ l per minute. Use of this kind of flow inhibited many from the coupling of electrospray with analytical sized LC columns, even with post column splitting. Some, with expertise with microbore LC columns, have coupled this technique to their LC's, but the ability to utilize a complete gradient from 100% H₂O to 100% MeOH or ACN was difficult to impossible. To span five or more sessions within a paragraph or two is difficult, but to many of us, the real breakthrough shown at the meeting was that data presented on new ion sources allowing flows of 200 μ l per minute to 1.0 ml/min within an entire gradient program. While most manufacturers stated that 1 ml/min is possible, they all stated that flows from 200 - 400 μ l/min were the most preferable. To most of us, use of a 2mm column is a happy medium ground, whereas 10 μ l/min was intolerable. Orals and presentations by the manufacturers showing these sources on both quadrupole and magnetic instruments demonstrated the utility of the technique as

well as the low pressure with increased sensitivity of these ion sources.

Another technique shown off by the manufacturers at this meeting was APCI. As discussed previously, this technique gives similar data to thermospray when using a discharge electrode or filament. The advantage of the technique is simply improved performance of the instrument, as most of the solvent is ionized outside of the mass spectrometer's ion source, with a small amount being sucked in by the vacuum to the ion source. The pressure inside the ion source is lower, which can result in increased sensitivity. The mass spectrometer's rough pumps take less of a beating. A combination

"These hospitality suites are not to be belittled nor the scientific benefit minimized. There is much exchange of information during these informal sessions and much can be learned by socializing."

ESI/APCI ion source will be offered by some manufacturers, again, both on quadrupoles and magnetic instruments. The advantage of the magnetic instruments versus a single quad is resolution and increased sensitivity. The magnetics are better, in our estimation, for qualitative work. An advantage of the triple quad is that it is better for quantitation with extreme low levels of detection for targeted species.

Another interesting aspect utilizing ESI came from the Fourier Transform (FT) people. Many papers as well as the workshop on "High Mass, High Resolution" focussed on what may be an important coupling of techniques. The utilization of FT for qualitative work seems unparalleled. The ability not only to obtain high masses with all isotopes resolved, but to obtain elements of the molecular ion clusters at high resolution allows for additional degrees of confirmation, especially for important unknowns. This will have significance for the pharmaceutical mass spectroscopists, and those in biotech companies where identification of the important protein or peptide, with or without modifications, may lead to a new product. Errors in mass of or equal to 1 ppm seems incredible, but reasonably routine for this class of

instruments. It is believed that for performance, these instruments utilizing the newer ionization techniques with external ion sources, may be the best. The external ion sources keep pressure down in the analyzer, allowing high resolution to be somewhat independent of source pressure, a necessity for techniques such as electrospray and FAB or SIMS.

Another area of extreme interest at the meeting was matrix assisted laser desorption ionization (MALDI) mass spectrometry. This technique is useful for obtaining intact molecular weight of proteins and modified proteins up to 100,000 or 200,000 or more Daltons. The accuracy of this technique is better than 0.1%, with some results obtained better than 0.01%. In a species of 50,000 molecular weight, this is equivalent to an error of about 5 mass units. This is enough accuracy to tell if a species is glycosylated (addition of 162 AMU) or similarly modified, but obviously not enough to detect deamidation, where substitution of the NH₂ on the amide by an OH is only a shift of a single AMU. To circumvent this problem, preliminary data was shown on instruments such as the FT mass spectrometers, but it was obvious that many problems occur from the energy spread of the laser increasing the spread of the ion beam with subsequent loss of resolution.

Wednesday morning's plenary lecture was given by Ron Hites, our past president. Ron was an excellent choice for this, and discussed, with charm and humor, the state of mass spectrometry in environmental science. The next item on Wednesdays agenda was the presentation of the award for distinguished contribution to mass spectrometry. This year it went jointly to Christie Enke of Michigan State and Richard Yost of the University of Florida for development of the triple quadrupole mass spectrometer.

A note about the workshops may be in order. With attendance at 2200, a small group of individuals having great interaction may be very difficult if not impossible. We feel that the majority of workshops in past years have never lived up to potential, and this year was no exception. There were indeed some good workshops, not all were poor. Another fact was, that by starting the workshops at 8PM most everyone was quite tired after long days going from 7 AM to 10 or 11 PM. The good ones had a number of presenters using perhaps only 2 or 3 overheads talking no more than 10 minutes, then soliciting questions and comments from the general audience. Some workshops

had presenters talking 30-40 minutes, and after that most people have lost the train of thought and could care less about asking a question. Perhaps the board should come up with new ideas on how 2200 people can interact in workshops. It may not be possible, and if so, the format should be changed. Perhaps the name should just be changed from workshop to supplemental lectures.

The number of symposia, both oral and posters were numerous. It would be difficult to overview them all, as they covered topics from APCI to Xenobiotic Metabolism. The quality of the work accomplished by the overwhelming majority of presenters was outstanding. Applications included work in Biochemistry especially in determination of the structures of proteins and peptides as well as carbohydrates. Also, orals and posters were presented which included the areas of Environmental Science, Inorganic Chemistry, Bio- and organic polymers, Trapped Ions, Surface Analysis and many others. We will try and highlight in the next few paragraphs some of the papers of interest to us. Hopefully these were also of interest to many of you too.

On Tuesday morning, Dr. Jack Henion presided over a symposium which was on LC/MS of small molecules. Small molecules are of interest to us, and this topic was not really given its due in the past. Specifically important was the presentation by Dr. Bill Budde of EPA and his evaluation of where LC/MS is in regard to new regulations. Overall, the technique has not demonstrated the usefulness for multicomponent analysis with semiquantitation as has GC/MS. Carrier effects from coeluting species, resulting in response changes in the particle beam mode, and lack of fragmentation in thermospray are problems effecting general utility of LC/MS. Still, the EPA has come out with optional LC/MS methods, including method 8325 (particle beam) which includes benzidines, carbamates, urea pesticides, thiourea and rotenone. Thermospray may be used in method 8321, which includes the organophosphate pesticides, phenylacetic acids and carbamates. A subsequent talk in the same symposium by Dr. Bob Voyksner, showed electrospray on the newer ion sources coupled with chromatography for various pesticides. Another talk by Pat Rudewicz showed a comparison of electrospray for drug conjugates. Another symposium on Environmental Analysis chaired by Judith Charles focussed on the wide variety of techniques that can be used

to determine contaminating species, including Ion Trap methodology, laser Desorption MS, Isotope Ratio MS, Ion Mobility Spectrometry, and of course MS/MS.

While the focus of this meeting was predominated by LC/MS, a lot of papers focused on the determination of volatiles by several new dynamic headspace techniques utilizing GC/MS. A handful of authors showed the identification and semiquantitation of volatiles in various food products using short path thermal desorption and other devices. Other authors showed data using a variety of devices on volatiles in various samples including books, tobacco smoke, polymers, inorganic matrices, and naturally water.

As usual, the board likes to keep some of the best papers and the best speakers until Friday morning. Speakers in a session entitled Immunology included Ron Cerny, Cathy Costello, Don Hunt and others. At this latter stage of the meeting, this session seemed more informative in the area of biochemistry than mass spectrometry. This is very positive, as by this time of the week all spectra seem to be identical as well as boring, and to emphasize the mechanism that certain compounds possess for disease control and for fighting cancer is the best way to present a paper at this time, at least in our estimation. Another session on polymer analysis ended with a very excellent speaker, Dr. Bob Lattimer, another example of last but not least.

In summary, this was the meeting where LC/MS prevailed, and the electrospray applications finally came to prominence. The technique will continue to grow in the future, as many of the applications using this technique this year did not involve chromatography, or utilized an isocratic HPLC system or a simple gradient. With the advent, as presented, of the electrospray sources which can take flows compatible with analytical or 2 mm columns without splitting, the applications will grow exponentially. Not to be tossed aside lightly are thermospray and particle beam modes, as well as APCI and ionspray. An example of an incredible spectrum and piece of work as obtained by thermospray was shown in a paper by J. Matusik on garlic chemistry, specifically on a very, very labile precursor called allicin. This low molecular weight species has never been analyzed by any MS technique. The first data on this was shown at this meeting. Probably one has to be a food chemist to appreciate this. Other papers showed high efficiency gradient HPLC

chromatography of multicomponent mixtures as obtained on particle beam and thermospray interfaces, something not seen yet by electrospray.

A final word about the great "con game" going on in San Francisco. Many times we noted people trying to talk to the tourists like they were experts in certain areas. One time, at the pier, a man in a not-so-official uniform stopped two tourists and was giving them a ticket for jaywalking while on the pier. The tourists totally believed this, gave their names, addresses and licenses to the "officer" and were given phoney summonses. We were laughing hysterically from a distance while this was going on. The tourists were near the boardwalk, not crossing the street. A lady in a uniform and with a badge stopped us later in the week for the same purpose on almost the same spot, but we laughed at her, and told her we knew what was going on. Other shenanigans with different modus operandi occurred at cable car stops and around the city.

At one of the ASMS workshops, and not to mention which one, an intruder appeared, and stated he was a professor from a nearby university. He wanted to discuss his "new idea" for a mass spectrometer. His badge was hand written, and the moderator did not know who he was. At a workshop, however, everyone has the right to speak. This man was obviously a scientist, or had scientific training, and talked for perhaps 10 to 15 minutes on his new mass spectrometer based on a centrifuge. Most attendees had their mouths open as he talked, or were dozing or daydreaming in boredom. We tried to pay very close attention as the man jumped from one topic to the next, with little continuity. Most just got up and left after he finished as his was the last presentation. Some noted professors asked him a few questions. We figuratively started rolling on the floor in laughter. We believe this man was a "Con Artist". Although he claimed he was a physicist, his name was not in the American Physical Society listings. Later discussions with some colleagues we respect very much who were there, did not change our minds. No one knew if what he was saying made much sense. Perhaps some of you can shed light on this subject or can think of things that happened to you in the city.

Next years meeting will be in Chicago. We hope to see you there.

ASMS Hospitality Suite 1993





MASS SPEC TIPS

FROM SCIENTIFIC INSTRUMENT SERVICES

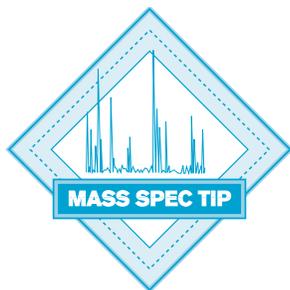
Mass Spec Tips

"Mass Spec Tips" is a new section in this newsletter which will become a standard feature in each edition of this newsletter. It is anticipated that this newsletter section will become your forum for the exchange of ideas on the operation and maintenance of mass spectrometers, methods and techniques for sample handling, and ideas for unique problem solving. The use of mass spectrometer computer software as well as its modification can be included and Macros that you have written for particular applications can also be included. Over the many years that mass spectrometers have been utilized, many problems have been encountered and solved by numerous operators only to have the same problem reoccur for another operator. We know that there are many techniques, methods, and problem solving solutions that you discovered, developed or modified over the years for a particular application or problem which was not published and may be of some value to other mass spectrometer users. Now is your chance to make known your ideas and suggestions.

If you have any ideas, tips or suggestions please give us a call or drop us a note to have your input included in this new forum. Also if you would like to know the answer to a mass spectrometer problem that you have encountered, give us a call and we will try to solicit some input from our readers to your problem. In order for "Mass Spec Tips" to flourish, we need your input, so please give us a call. Authors names and affiliations are listed at your discretion. S.I.S. reserves the right to select or reject ideas for publication in this section.

FREE TV

All Authors will be compensated \$50.00 for each "Mass Spec Tip" published in this newsletter. In addition we will be selecting one person each year at the ASMS meeting from the contributors to both "Mass Spec Tips" and S.I.S. feature articles to receive a free 17" color TV or gift certificate. For each tip or article published in this newsletter between consecutive ASMS meetings, the author will receive one chance at this yearly drawing.



(1)

Selection of Vacuum Pump Oils for Lowest Mass Spec Background

Author: John J. Manura

Affiliation: Scientific Instrument Services

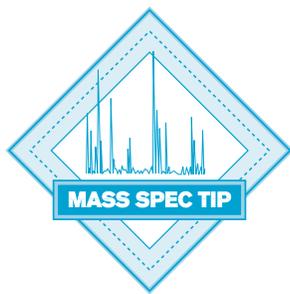
Significant background peaks are present in the mass chromatogram especially when using the mass spectrometer to detect and identify samples in the sub nanogram levels. These peaks occur due to backstreaming of the hydrocarbons from the oils into the mass spectrometer source. In both the rough pumps and the diffusion pumps, oils are used which can contribute to this spectra background. Backgrounds in the spectra can occur due to byproducts in the oil itself or due to

mass spectrometer samples which are collected and trapped in the pump oils as samples are analyzed. The high temperatures and continued 24 hour a day use of the oils can cause them to break down (commonly referred to as cracking). These lighter fractions can cause peaks in the mass spectrometer background. In order to minimize these background peaks the rough pump oils should be changed every three months and the diffusion pump oils every 2 years. When changed the oils should be replaced with the most highly refined highest molecular weight chain hydrocarbon fractions which can be safely utilized in the vacuum pumps.

About 5 years ago we replaced the Inland 19 Oils in our rough pumps with Invoil 21 which was more highly refined and produced better backgrounds. Although this oil was more expensive it produced lower vacuum pumping capacity and minimized mass spectrometer background. In the last two years Inland 45 has been developed which is even more highly refined and will produce the least amount of vacuum pump backstreaming. It can be used in all Alcatel,

Edwards and Leybold vacuum rough pumps utilized on mass spectrometers to obtain the lowest mass spectrometer background and optimum vacuum pump performance. We now use it in all of our instruments.

For the diffusion pump Santovac 5 is still the best quality oil available. In the more than 30 years that Santovac 5 has been routinely used in mass spectrometers, no new oil has been developed which surpasses its low vacuum level pumping capacity as well as its low backstreaming. For diffusion pumps which currently use other oils, the user must check that Santovac 5 can be used in these pumps before replacing the oil. The boiling point of the diffusion pump oil must be matched to the heater cartridge wattage in the diffusion pump. We have safely replaced the diffusion pump oils in the H.P. 5971 with Santovac 5 without any change in the diffusion pump heaters. The only improvement to the use of this oil in diffusion pumps would be to replace the diffusion pumps with Turbo pumps. Turbo pumps will provide the lowest background levels.



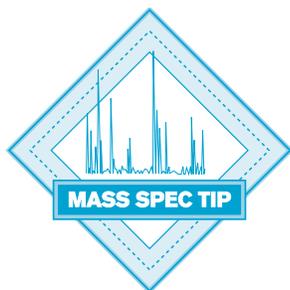
(2)

Determination of Disulfide Linkages in Biomolecules

Author: Anonymous

Affiliation: Pharmaceutical Industry

A fast and easy way to detect the presence of disulfide linkages in peptides during static FAB or LISIMS analysis is to dissolve the analyte in a sulfur containing matrix (i.e., thioglycerol, magic bullet, etc.) and add a trace amount of dilute ammonium hydroxide. We have found that this mixture causes immediate reduction of disulfide linkages (converting them to free-SH groups) with the expected 2 dalton mass increase per disulfide group.



(3)

Transfer of H.P. ChemStation MS and GC Chromatograms from PC to MAC Computer

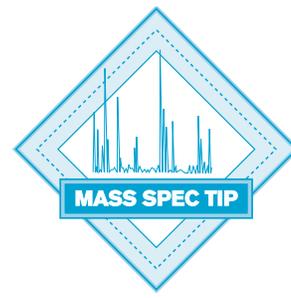
Author: John J. Manura

Affiliation: Scientific Instrument Services

In our laboratory we presently utilize two H.P. 5971 mass spectrometers and one H.P. 5989 Engine for the analysis of samples from our Short Path Thermal Desorption and also in our mass spectrometer probe development work. All the data is collected on PC computers utilizing the H.P. ChemStation Software used in the Windows environment. However our newsletters, catalogs and other advertising material are all generated on Apple MAC format computers. All our graphics are performed on the MAC's due to the greater versatility of software available for these instruments for draw-

ing, photo retouching and graphic layout. However the transfer of our mass spec data from the PC's to the MAC's has always been a problem due to the different formats utilized by these instruments. Previous to this year we either scanned the charts in using a scanner or used some file transfer programs to transfer the data. However the files produced by both of these methods were quite large since they were transferred in a bit map format. In order to obtain smaller files and higher resolution in the charts, we had to retrace the chromatograms on the MAC computers. This procedure was very time consuming.

Recently we were able to transfer the data directly from the PC to the MAC computers using the software program PowerPoint for both the PC and Apple MAC computers. The resulting file is in the vector format and is quite small in size. For this operation you must have PowerPoint software for the PC and the latest version of PowerPoint for the Apple computers (only the latest version of PowerPoint has the file conversion capacity for the Apple Computers). To begin the operation first select the chart or chromatogram from the ChemStation software operating under Windows. Next copy the window to the clipboard. Load the PowerPoint program and paste the clipboard file to the PowerPoint screen using the Paste function (do not use the Paste Special function). Resize the picture to fill the screen and then double click the chromatogram. The computer will ask if you want to convert the picture to the Power Point format, answer Yes to this question. When finished you can edit the chromatogram, including eliminating text, changing text size or style, change colors or editing the chromatogram itself. When finished save the file to a 3.5" floppy disk. This file can now be read directly from this disk into the Apple computer using the Apple PowerPoint Software. The resulting chromatogram will look identical to the chromatogram as it appeared on the PC PowerPoint screen and is still in vector format which means the chromatogram will have the optimum resolution (the chart is a true line and not a series of points). The chromatogram can be further edited, colored or changed for output to slides, color printers or incorporated into other software for the production of publications.



(4)

Repairing Clogged Thermospray Probes

Christopher Baker

Scientific Instrument Services

Probe inserts for the thermospray interfaces used by Vestec, Hewlett-Packard and others become clogged by salts, polymers and particles. Use of an in-line filter before the probe removes the particles, but will not completely eliminate the problem. The probe, with its small inner diameter, typically 100 microns, is still susceptible to clogging.

We have designed a probe insert in which clogged capillaries are easily replaced by the user. There is a guide tube inside the 1/4" thermospray insert which has an inner diameter which allows a new 100 micron stainless steel (s.s.) capillary to be inserted. The thermocouples are spotwelded to the outside of this guide tube. See the schematic on page 16 of this newsletter. Replacement of the clogged 100 micron s.s. capillary is fast and simple because of this design. When a capillary becomes clogged, it is cut at the back of the insert using a tubing cutter. Use of a tubing cutter is necessary so as to obtain a smooth surface, important because the capillary has to slide through the guide tube which is closely matched to the outside diameter of the capillary. The swagelok fitting is loosened at the tip of the probe and the clogged capillary slid out the end of the probe. A new 100 micron s.s. capillary is then inserted through the guide tube, and a new stainless steel ferrule placed at the tip of the probe and tightened. The probe is then ready for use.

Operation parameters of the probes are similar to the original manufacturers' probes, especially when using filament or discharge modes. These probes have been shown to produce a very stable baseline with similar or better sensitivity. Take-off temperatures may be different than those observed with the original manufacturers' probes, perhaps important for those doing ion evaporation experiments where no filament or discharge electrode is being used as a source of electrons. However these new probes have been used successfully on both the Hewlett-Packard 5988 and 5989 mass spectrometers as well as the Vestec 201 LC/MS system.

FEATURED PRODUCTS

FROM SCIENTIFIC INSTRUMENT SERVICES

J&W Model ADM2000 Intelligent Flowmeter

The Most Advanced Flowmeter on the Market



The new ADM Intelligent Flowmeter is a true Mass Flow meter used to measure gas flow in the range of 0.1 to 1000 sscm/min independent of gas type, unlike other flowmeters that must be calibrated for one specific gas. Accuracy of the three digit LCD displayed output is +/- 3% of the reading. The flowmeter is an invaluable tool for the accurate calibration of GC gas flows, detector gas flows and GC split ratios for the optimum performance of your GC or GC/MS. The system is unique in that the operator can adjust flows via the instrument valves and regulators and instantly visualize the true flow on the ADM2000 Flowmeter, unlike bubble meters which require waiting and timing of the gas bubble flow. The display is auto ranging throughout the entire flow range and can be used with any non-corrosive gas. The ADM2000 is compact, rugged, lightweight and battery operated. In addition to timesavings, it is accurate and easy to use. The ADM2000 is in stock and available from Scientific Instrument Services.

Part #	Description	Price Ea.
220-1171	ADM2000 Intelligent Flowmeter	\$595.00

Inland 45 Rough Pump Oil



Inland 45 is the most highly refined pump oil now available for use on rough vacuum pumps on mass spectrometers. Its vapor pressure at 25° C is less than 1×10^{-7} torr, and will produce the best vacuum and lowest background when used in mass spectrometers. This oil can be used in all Alcatel, Edwards and Leybold vacuum rough pumps. For the optimum performance of the vacuum pumps on your mass spectrometer, we recommend that Inland 45 be the oil of choice. For the optimum life of your vacuum pumps, any oil should be changed every three months in order to prevent excessive wear of the internal parts of the pump.

Part #	Description	Price Ea.	4 or more
INV 45-1	Inland 45 - 1 gallon bottle	\$77.25	\$74.35 ea.

Santovac 5 Polyphenyl Ether Diffusion Pump Fluid



Santovac 5 will achieve the ultimate vacuum when used in diffusion pumps. The vapor pressure of Santovac 5 is 4×10^{-10} torr, which is the lowest of any other vacuum pump fluid available and enables this fluid to attain vacuum levels down in the 10^{-10} torr range. It also has the lowest backstreaming characteristics, high tolerance to pressure bursts and excellent thermal stability. For optimum performance of your mass spectrometer, any diffusion pump fluid should be changed when it becomes discolored or milky in appearance or after two years of continuous use.

Part #	Description	Price ea.
SV-5	Santovac 5 Diffusion Pump Fluid, 500 ml bottle	\$465.00
*SV-100	Santovac 5 Diffusion Pump Fluid, 100 ml bottle	\$135.00

EXTREL ELQ-400 Heater, Wired in Parallel



These heaters are very similar to the EX100 Heaters we manufacture except that they are wired in parallel. In some applications, Extrel has begun to specify this wiring for better results. Both the old (EX101) and new (EX101P) styles are available from S.I.S.

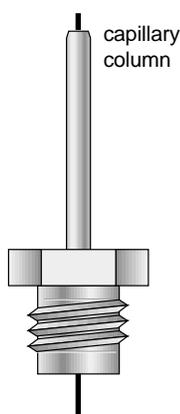
Part #	Description	Price ea.
*EX101P	Extrel Heater, wired in parallel	\$95.00
EX101	Extrel Heater, wired in series	95.00

* New Part Numbers

New

H.P. 5971 Transfer Line Tip

The transfer line tip for the H.P. 5971 MSD has been redesigned to permit the effluent from the end of the capillary column to purge directly into the MSD source, unlike the original gold plated transfer line tip in which the effluent purged inside this fitting and was diverted through side vents. This new design eliminates any Inlet metal contact with the sample, the capillary column protrudes slightly thru the end of the tip directly into the source. This new design should result in higher sensitivity for compounds which are sensitive to any metal contact.



Part #	Description	Price ea.
*HP99	HP 5971 Transfer Line Tip	\$79.00

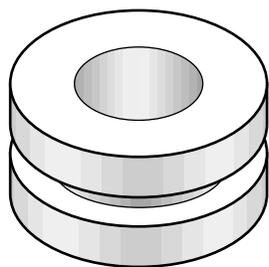
Fuse for H.P. 5989 Engine

A new large fuse used in the Engine is now available from S.I.S. It is rated at 500 Volts and 0.2 Amps.

Part #	H.P. Part #	Description	Price ea.
*FLQ210	2110-0835	Fuse, 500 Volts, 0.2 Amp, Ea.	\$20.00

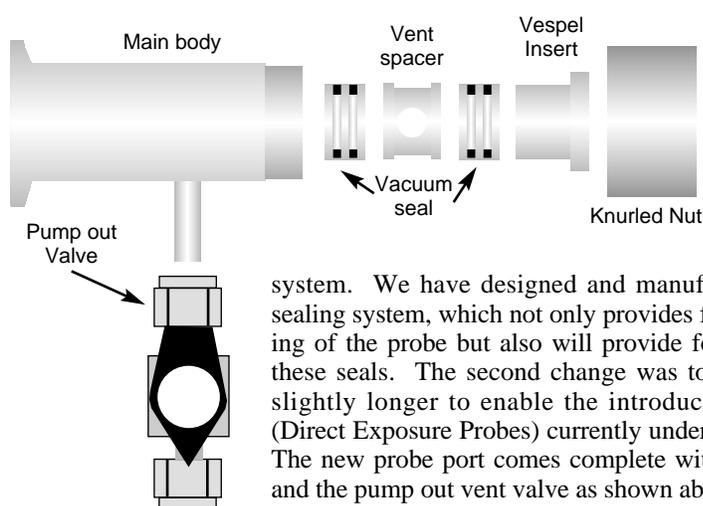
Plate Insulator for H.P. 5989

The ceramic plate insulator used in the H.P. Engine source is available from S.I.S. It is made of high purity alumina ceramic.



Part #	H.P. Part #	Description	Price ea.
*HP14	05989-20109	Plate Insulator for H.P. Engine.	\$25.00

New Redesigned Inlet Port for HP 5989 Engine



SIS has redesigned the probe inlet system for the HP Engine. This new port has two major improvements. The first improvement is in the probe sealing system. We have designed and manufactured a new Teflon sealing system, which not only provides for better vacuum sealing of the probe but also will provide for much longer life of these seals. The second change was to make the probe port slightly longer to enable the introduction of the new DEP (Direct Exposure Probes) currently under development at S.I.S. The new probe port comes complete with probe port, all seals and the pump out vent valve as shown above.

Part #	Description	Price Ea.
*PI200	Probe Port for HP Engine Complete with seals and valve	\$695.00
*PI250	Replacement seals for SIS Probe Port, set of two complete	65.00

H.P.Engine Probe Port Parts

S.I.S. can now supply a wide variety of parts for the H.P. Engine in addition to the parts listed in our catalog. The following parts replacement for the H.P. Probe Inlet System are available.

Part #	H.P. Part #	Description	Price Ea.
V320	0905-1190	KF25 Viton 'O' Ring	\$2.98
V211	0905-0819	Valve Stem Viton O' Ring, Horiz, ea.	1.21
V113	0905-0818	Valve Stem Viton 'O' Ring, Vert., pkg of 10	6.70
HP12	0905-0820	Probe Inlet Seal	12.50
*SS4P4T	0101-0606	Pump Out Valve, Nupro 1/4 turn Ball Valve	63.00
*NS25025	05989-20724	Hose Adaptor, KF25 to 1/4" Tube	45.00
L-25	6040-0289	Apiezon L Grease, 25 gram tube	68.00

H.P. 5971 GC/MS Interface Repair

In addition to replacing the 1/16" Swagelok fitting on the H.P. 5971 GC/MS Interface, as described in our catalog, S.I.S. can now replace damaged heaters and temperature sensors should they burn out. This new repair includes the replacement of both the heater and the platinum temperature sensor. Other repairs of transfer lines including redesigns of this interface are also available from S.I.S. Parts to perform this repair are also available, if you have the



Part #	Description
REP88	5971 Interface Repair
\$130.00	
REP89	Interface Heater/Sensor

Metric 'O' Rings for

Finnigan MAT Instruments

S.I.S. can supply most sizes of 'O' Rings as listed in our catalog. These include Viton, Buna, Silicone, Teflon and Kalrez. In addition to the English dimension sizes listed in our catalog we can also supply metric sizes. The following metric size 'O' Rings are now in stock and ready for shipment. For additional sizes, give us a call.

Part #	Finn Part #	Description	Price ea.
*VM323	00950-00910	Viton 'O' Ring, 3mm thick x 32mm I.D.	\$6.50
*VM283		Viton 'O' Ring, 3.0mm thick x 28mm I.D.	\$6.50
*VM1815		Viton 'O' Ring, 1.5mm thick x 18mm I.D.	\$1.75

CDS Pyroprobe Quartz Liner

The quartz liner which the 1/4" O.D. CDS pyroprobe slides into is now available from S.I.S. These thin wall quartz liners are very fragile and are easily damaged. The tube is 3.156" long and has an O.D. of 0.307" with an I.D. of 0.256".

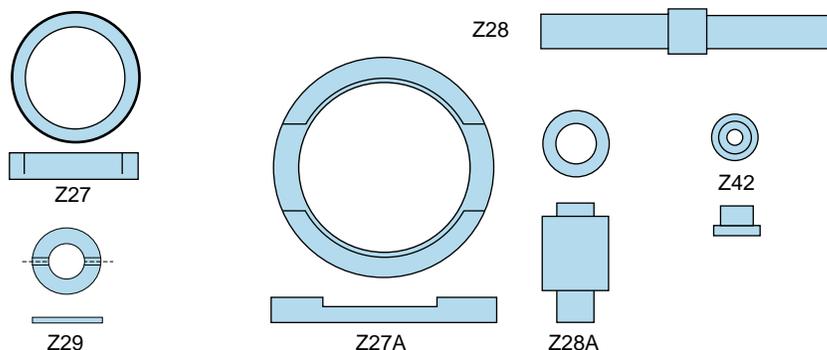
Part #	Mfg. Part #	Description	Price ea.
*QL1	1002-0272	Quartz Liner for CDS Pyroprobe	\$39.00

New Filament/Heater Wire

In addition to the filament and heater material listed in our 1993/1994 catalog we have added the following wire, and VG DCI platinum coil.

Part #	Description	Price ea.
W450	1% Thor. Tungsten Wire, 0.007" dia.	\$9.00/ft.
HC15	Platinum Coil for VG DCI Probe Tip	\$8.00

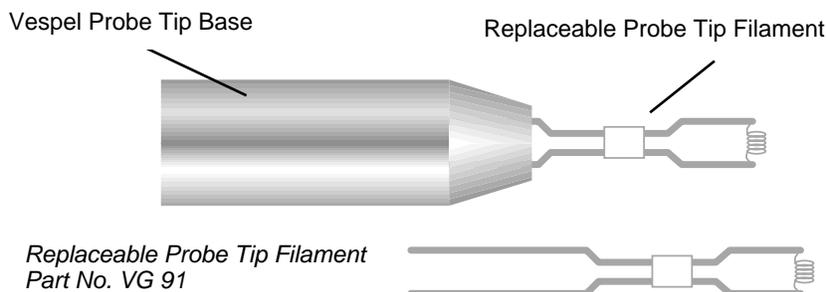
Finnigan MAT Ion Trap Ceramics



Several new ceramic insulators are now available for the Finnigan MAT Ion Trap in addition to the ceramics listed in our catalog. All ceramics are constructed from high purity alumina ceramic. In addition the ceramics kit for the ITD is also available. This kit consists of two gate insulators (Z27A) and six position pins (Z28A). For other ceramics or special requirements of ceramic insulators call us with your requirements.

Part #	Finn Part #	Description	Price Ea.
Z27		Gate Insulator, older instruments	\$38.50
Z27A	94011-20008	Gate Insulator	48.00
Z28	94011-20112	Position Pin Insulator	23.00
Z28A	94022-62052	Position Pin	34.00
Z29	94011-20133	Electrode Spacer	25.00
*Z42	94022-20012	Ceramic Bushing for ITD	11.50
*ITK100	6040-0289	Analyzer Kit for Finn MAT ITD, 2-Z27A & 6-Z28A	300.00

New DCI Probe Tip Design for the VG Mass Spectrometers



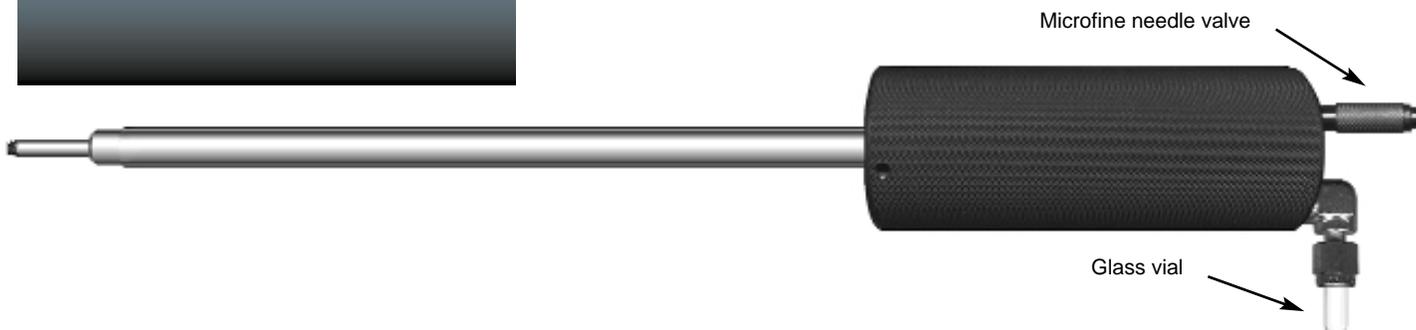
S.I.S. has redesigned the DCI Probe tip for the VG TRIO 1000 and 2000 instruments. The new design incorporates a Vespel DCI Probe Tip Base which plugs into the tip of your existing probe. Then the replaceable Probe Tip Filaments are plugged into this new Vespel Probe Tip Base. Once the Vespel Probe Tip Base is purchased, the cost of repairing or replacing the probe tip filaments is much less than those available from the manufacturer. This new DCI probe tip was designed for and tested by several of our customers. The DCI filaments performed the same as those originally used but the replacement cost is much less.

Part #	Description	Price Ea.
*VG90	Vespel DCI Probe Tip for VG TRIO 1000 and 2000	\$300.00
*VG91	DCI Probe Tip Filament for VG TRIO 1000	75.00
*VG92	DCI Probe Tip Filament for VG TRIO 2000	75.00
FILREP	Repair of SIS designed DCI Tip Filament	27.00

* New Part Numbers

HP CALIBRATION GAS PROBE

*for the Hewlett Packard Engine
(also available for other Mass Spectrometers)*



- For the Direct introduction of Calibration Fluids into the Mass Spec source
- Also for the direct analysis of Liquid Samples
- Microfine Needle valve for regulation of sample flow into MS source
- Removable glass sample vial for liquid samples
- Available for HP Engine and other mass spectrometers

This new Calibration Gas Probe was designed for the quick and accurate introduction of liquid or gas samples directly into the Mass Spec source via the probe inlet. The calibration gas or fluid (or any liquid sample) is placed in the removable glass vial in the handle of the probe. The calibration vials can be quickly and easily changed to permit the analysis of multiple liquid samples. The vials hold approximately 2.0 ml of liquid or custom size vials can be ordered on special request. The rate of flow of the sample into the mass spec source is regulated via the microfine metering valve on the end of the probe handle.

The Calibration Gas Probe offers the advantage for the analysis of multiple liquid samples quickly and easily. In addition, when you are done calibrating the mass spectrometer with the calibration fluid of choice, the probe (and the source of calibration fluid) is removed from the mass spectrometer. This will help minimize the effect of lingering peaks in the mass spectrum due to calibration gas slowly bleeding through the standard calibration gas inlet system. This is particularly helpful in the negative ion CI mode of operation where trace levels of lingering calibration fluids can take several hours to disappear from the spectrum.

Typical applications are as follows:

- ◆ Introduction of multiple Calibration fluids such as Perfluorokerosene (PFK) or perfluorotributylamine(FC-43) into the mass spec source for Mass Spectrometer calibration.
- ◆ Introduction of a constant low level of mass marker ions into the source over a period of time for accurate mass calculation or sample quantification
- ◆ Analysis of liquid samples via direct bleeding of the sample into the mass spec source

Part #	Description	Price
CAL1	Calibration Gas Probe for the H.P. Engine with one glass vial and needle valve	\$1995.00
CV1	2.0 ml Glass Vial for Liquid Sample	\$11.00

NEW THERMOSPRAY PROBE

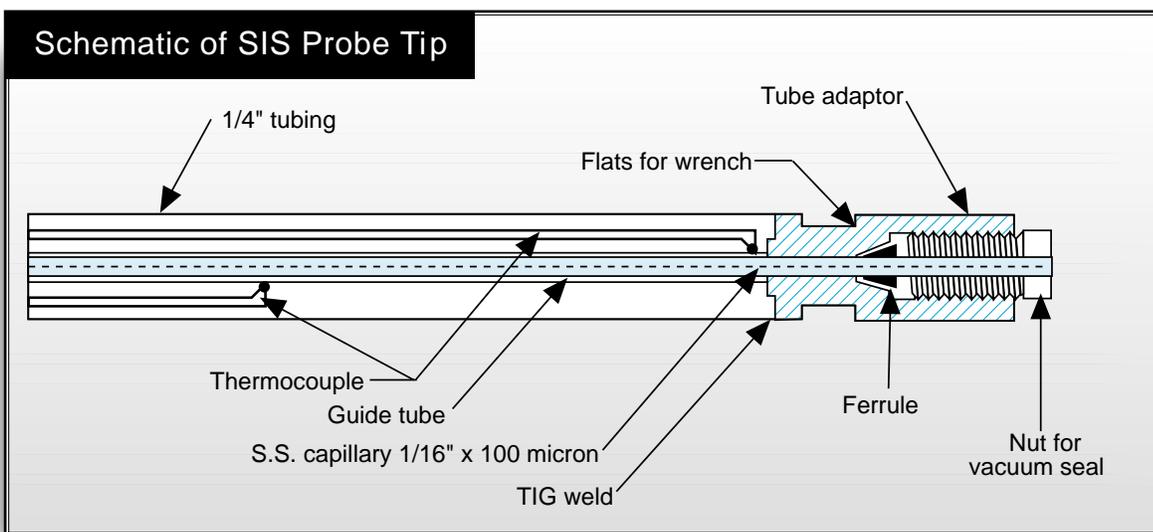
Thermospray probes with replaceable inserts for H.P. and Vestec instruments.



Scientific Instrument Services has redesigned the Vestec thermospray probes so that the capillary inserts can be quickly and easily replaced by the user when necessary. Clogging problems with the original vestec thermospray probes is well documented. The original probes when they became clogged were virtually impossible to unclog and therefore the probe had to be sent back for repair or be replaced completely.

Replace the clogged capillary inserts quickly and easily

The new design allows the user to repair the thermospray by simply replacing the 1/16" O.D. x 100 micron I.D. capillary using a Swagelok type fitting. (See the schematic of the probe tip). The standard 1/4" diameter tubing is used



for the outer probe shaft, however, the end of the probe is fitted with a tube adaptor, stainless steel ferrule and nut which when tightened provides the vacuum seal around the capillary tubing. To replace a clogged capillary, use a tube cutter to cut the capillary at the back of the probe, loosen the nut, slide out the 1/16" clogged capillary, and insert a new capillary. The thermocouples are spotwelded to the inner guide tube into

which the replaceable capillary slides. A spotwelder is not required, and replacement is easy. The standard 1/4" probe length is 13.5" and the replaceable capillary is 14.75". The capillaries have an inner diameter of 100 microns. This provides for a very stable signal and maximum sensitivity. Other sizes and lengths are available on request. These redesigned probes exhibit very similar temperature and pressure para-

Part No.	Description	Price ea.
TSP1	Vestec TSP Probe with replaceable insert	\$495.00
INS1	Vestec TSP Probe Replacement Insert, 100 micron ID	\$20.00
S-103-1	1/16" S.S. Ferrule for tip end of probe	\$2.74