



# ASI TODAY

A newsletter for customers of Analytical Sensors & Instruments

Winter 2003

## From the President's Desk



Peter Cai, President

### Dear Customers & Friends:

ASI experienced another record-breaking year in 2003. The success was largely attributed to all your support, as well as to our versatile capabilities in design, technical support, and a flexible pricing strategy. As you have seen at the front of this newsletter, 2004 announces ASI's 15<sup>th</sup> anniversary. Looking forward, we see more success ahead and hope to share this bright future together with all of you.

Over the last two years, ASI has greatly enhanced our core technologies, improving our ISE quality, and introducing a new pH sensing glass to our offering. In addition, we have also expanded into other areas to better service our customers. ASI is successfully offering our customers a unique market advantage where we combine our first class engineering design capability with our China manufacturing price

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## Growing the Bottom Line and Protecting U.S. Manufacturing Jobs by Sourcing Plastic Injection Molded Parts, Tooling and Manufacturing Assembly in China.

Over the last two decades China has grown to become a manufacturing low cost source center. This growth trend is likely to continue and the political and economic ramifications of it are likely to grow at least as rapidly. According to N. Gregory Mankiw (Chairman of the Council of Economic Advisers), over the last decade China has roughly doubled their exports to the United States. This has been accomplished not by taking jobs away from hard working Americans - but by dramatically improving China's manufacturing capabilities and taking business away from other Pacific Rim Countries. Many disagree with Mr. Mankiw and can see this only



Domestically, it is often impossible for a company that has an opportunity in a niche consumer market to meet that opportunity if the requirements are for an innovative, high quality yet low cost product that has sales forecasts that only number in the hundreds to low thousands of pieces annually. Such numbers often limit the manufacturer's technologies to produce their proposed offerings to high cost machining or expensive rapid prototyping methods thereby creating an economic hurdle to seize these opportunities.

Another barrier to entry into such markets, is that the marketing staff and product designers are forced by the matrix of expense and technology to avoid technologies such as plastic injection molding that offer unique and powerful design and aesthetic qualities that result in truly innovative cost effective designs.

In the area of tooling, molding and assembly of short run products, ASI has developed the means to provide dramatic advantage in costs, and innovative design to meet the consumer demand in many markets. Over the last five years, ASI has dramatically improved the bottom line of many companies thru outsourced Chinese molding and assembly. By providing the means of entry into

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*In the area of tooling, molding and assembly of short run products, ASI has the advantage in costs and designs to meet consumer demand.*

as a continual assault on the American worker and the financial stability of US companies. We at ASI have taken China's growing manufacturing capabilities and low cost labor, not as an assault, but as an opportunity to leverage our strengths to grow our business and that of many of our customers.



## Analytical Sensors & Instruments

*Measuring Your Success<sup>SM</sup>*

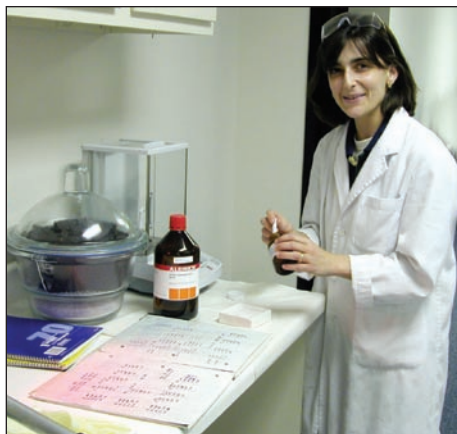


I am pleased to announce that we are concluding a project that was launched earlier last year to review and optimize our ISEs. This project shares the common goal with other ASI projects to improve the quality and performance of our products.

In the coming year, we will introduce 3 new species, which will complete our existing line of ISE's. As we speak, we are in the final stages of the development of a nitrite, a surfactant, and a magnesium ISE's, all 3 of the PVC type.

As most of you may know, Ion-Selective Electrodes (ISEs), when compared to other analytical techniques, are relatively inexpensive and simple to use, and have an extremely broad range of applications. Direct measurements are possible in samples

with concentrations ranging from less than 1 to several thousand parts per million (ppm) due to the wide measuring range of ISEs. For instance, the direct analysis, among other ions, of nitrite in soils and drinking



*Dr. Maria Berrocal  
Research Chemist*

and wastewater is made possible with a nitrite selective electrode.

With careful use and frequent calibration, ISEs can achieve precision levels of 2-3% which compares favorably with analytical techniques with require more complex and

expensive instrumentation. For instance, in complex matrices, the use of the known addition method, allows the accurate determination of the nitrite content in processed fish.

In addition, ISEs can be used for the continuous monitoring of changes in concentration, for instance, in the environment or as indicator in potentiometric titrations, as in the case of the surfactant ISE (which can be used for the determination of anionic as well as cationic surfactants).

One more advantage of ISEs is that since they measure ion activity (not concentration) they are particularly well suited in the analysis of biological/medical samples.

Now the million dollar question: Have I abandoned my quest for the Holy Grail of ISEs, the most wanted Phosphate ISE? All that know me a little bit know the answer already. Of course not, and I will never give up!

I will keep you posted with any addition to "our family". In the mean time, Happy New Year to all and may the year bring you all what your heart desires.

Previously, this column discussed the importance of the reference electrode in accurate, precise electrode systems.

The role of the reference electrode is to develop a stable, reproducible potential in standards and samples regardless of their chemical matrix. In order to accomplish this, the reference electrode's electrolyte must be chosen so as not to influence the potential developed at the reference junction. In many cases a second reference electrolyte chamber is designed into the reference electrode, which provides for a secondary or bridge solution. This bridge solution must not react with components in either the internal reference electrolyte (typically KCl saturated with Ag/AgCl) or the sample. Also, the bridge or outer electrolyte must not contain the ion of interest otherwise, measurements will be inaccurate.

## Probing For Success



Double junction reference electrode designs may accommodate refilling of the outer reference chamber or may be sealed. Either has advantages based upon the measurement application.

One important aspect of using a double junction reference in the laboratory is that the bridge solution must be at a higher level in the reference chamber than the sample into which the reference is placed otherwise, backflow and interruption of the measurement may occur.

Typically, double junction reference designs may be incorporated into combination electrode designs

without difficulty, thereby providing the convenience of a single electrode system.

ASI routinely incorporates double junction reference construction into combination pH and ion selective products to provide accuracy and precision as well as long service life.



# Analytical Sensors & Instruments

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Growing the Bottom Line ...  
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markets that companies can not hope to penetrate otherwise, ASI's customers have found time and again that such outsourcing can actually grow their payroll numbers and increase their profitability in the toughest of markets.

The challenge in manufacturing overseas, especially in China, is ensuring quality and communication. It is often said that the key to successful financial and manufacturing agreements in China is one of having proven long standing relationships, both working and personal. Through these relationships the advantages of ensuring profitability through growth and strategic alliances with companies already established within China is assured. ASI has built such solid relationships through the efforts of its owner and founder, Shanghai born, US Citizen Peter Cai.

By growing a company and developing relationships for the Chinese affiliate which are then used to provide almost instant strategic alliances for ASI

and its customers, the most difficult of hurdles can be overcome for US manufacturing companies wanting to grow into previously impenetrable niche markets. Following is a case study based on a single experience of ASI and its Chinese sister, Aurora Scientific Instruments based in Shanghai, China.

### Case Study:

In 2000, ASI purchased a mold from a USA based company for \$13,250. The mold consisted of three pieces of ABS plastic with half inch threads. The total per part price was \$0.85 for a minimum quantity of 10,000 units in each shipment. All units were delivered at one time. When an imperfection was found in the thread size, the US based molding company had ASI purchase another set of molds for \$9,975 to replace two of the three parts. Total time to design and create each set of molds was 8 weeks to first articles.

In 2002, ASI purchased the same molds, plus an additional mold to increase manufacturability, from Aurora (based in China) for \$2,000, with a total per part price of \$0.47 for a minimum quantity of 500 units in each shipment.

The units were stocked and delivered to ASI for just in time delivery. All changes to molds were absorbed by Aurora and not translated to our customer. Total time to design and create each set of molds was 4 weeks to first articles.

	US	China
Tooling	\$23,225	\$2,000
Total Part	\$0.65	\$0.47
Total Time	8 weeks	4 weeks

ASI has been developing this capability for over five years and is a rapidly emerging front runner in providing high quality, low cost tooling, molding and assembly in a low cost global region. Our customers utilizing these services are seeing continual growth in their sales and US workforce. With over 500 products currently being produced thru this process, our customers are satisfied - are you?

## people propHiles

This winter we at ASI would like to present our Engineering Director - Steve Zelenak. Steve has been a member of ASI for over 3 years, and he has made quite a contribution to the ASI organization.

Prior to joining ASI, Steve had been a Design Engineer for electrochemical products for nine years at Hach Company, during which time he earned a number of patents in the field. This was followed by a three year stint at Ultimate Support Systems, first as a Manufacturing Engineer, then as General Manager of a Medical Products Division which produced a highly innovative mobility device. While at USS, he honed his management skills and



*Steve Zelenak*  
Engineering Director

understanding of process and manufacturing systems in a CGMP environment (FDA Product Manufacturing).

With this experience, Steve has enabled ASI and our sister company in China to grow as organizations - developing the

best manufacturing processes. In addition to aiding the operations group, Steve stays very busy with new products. He has been at the fore front of our tooling and molding efforts, as well as providing the training for our engineering team to improve their skills.

Steve is married to Amy Zelenak and has a 17 year old son and a 13 year old daughter. They live in Colorado.

In our next issue of ASI Today, we will explore some of the exciting new products that ASI is currently developing. In addition, we will feature an article on our customer service team.

To learn more about ASI products and capabilities, contact Brian Williams at extension 124, [bwilliams@asi-sensors.com](mailto:bwilliams@asi-sensors.com), or Jeff Gross at extension 125, [jgross@asi-sensors.com](mailto:jgross@asi-sensors.com).



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**RETURN SERVICE REQUESTED**

Changing our name - **YES!** Changing our service, quality or reliability - **NO!** Read inside about the exciting changes at ASI and our cost reducing molding opportunities that you can benefit from **TODAY!**

From the President's Desk

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advantage to produce quality products.

We have been helping our OEM customers manufacture their small meters, electronic devices, and other non-sensor products at our Shanghai branch. All these products are manufactured either to our customers' design, or with the mechanical designs completed at ASI. In doing so, our customers enjoy ASI design features and the price savings from our branch in Shanghai, China, Aurora Scientific Instruments (Shanghai) Co., LTD. However, ASI will only develop and manufacture non-sensor products for our OEM customers or for those who are not in direct competition with our

OEM customers. ASI has no intention of promoting ASI brand meters.

The success in the last fifteen years leads to our determination that we will continue to follow the same path, i.e. continuously enhance our core technology in sensor manufacturing and continue to expand into other non-sensor product areas at the same time.

To reflect our determination, we even have changed our company name from Analytical Sensors, Inc. to Analytical Sensors & Instruments Ltd. However, this name change only exhibits our capability. Analytical Sensors & Instruments Ltd. is still ASI, the same

ASI which has been serving you for 15 years - innovative, enthusiastic towards quality and customer technical service, and fair pricing.

Thank you again for all your support.

May our Lord bless and keep all of us.

*Peter Cai*

Peter Cai