

# CLEARSignals

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**UYEMURA INTERNATIONAL CORPORATION**



**www.uyemura.com**

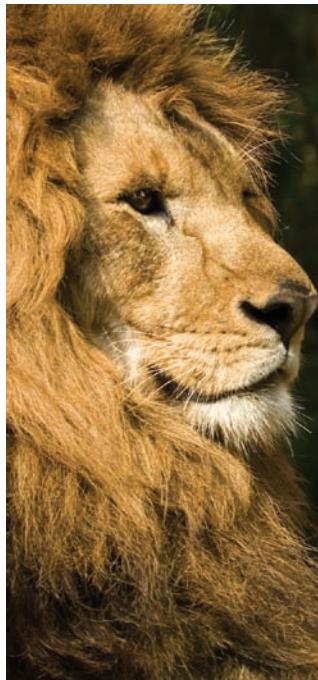
## ***Phoenix International and Uyemura International Earn Corporate Recognition Awards***

IPC will honor two industry leaders at their Annual Meeting Luncheon, March 31, 2009 in Las Vegas. Phoenix International will receive the *Stan Plzak Corporate Recognition Award*; Uyemura International Corp will receive the *Peter Sarmanian Corporate Recognition Award*. Both companies have 15 consecutive years of IPC membership to their credit, and numerous professional staff serving on standards development and other vital committees.



The *IPC Stan Plzak Corporate Recognition Award* is named for former Board Chairman and founding member of the IPC Electronics Manufacturing Services Industry Management Council, Stan Plzak (shown above left with Peter Sarmanian). The award recognizes a corporation in the electronics assembly industry (supplier, EMS company or OEM) that has actively contributed to enhancement of the industry while supporting IPC through its technical or management programs. ***Continued on page 4***

## **Our Pride: Continuous Improvement**



Uyemura's KAT Electroless Nickel/Immersion Gold process (ENIG) is the industry standard for producing uniform mid-phos EN deposits with a thin topcoat of immersion gold, over copper substrates. The finish is highly resistant to corrosion, and is both solderable and aluminum wire bondable. It is an ideal contacting surface.

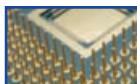
Smart KAT users never have to waste valuable time with "dummy plating." They also get:

- A low-concentration, room temperature, chloride-free catalyst
- A bath that runs at *least 10°F below the competition*, and
- Compatibility with all the new soldermasks

KAT has long been the "King of the Jungle" in high-performing mid-phos EN. That, however, would *never stop Uyemura chemists from trying to make it better*.

They have. It's called Nimuden NPR-8, a mildly acidic electroless nickel-phosphorus process engineered for EN/gold plating to selective PWBS with dry film masking. The catalyst, electroless nickel and immersion gold components have all been improved. NPR-8 offers unrivaled bath stability. Deposited film resists chemicals from OSP treatment (and pretreatment). It is ideal with lead-free solders.

Discover the ultra-robust electroless nickel that has outrun the KAT. Call your Uyemura representative today.



# A Strategy for Extreme Conditions

**By Don Walsh, Director of Operations**



The photo in one of our recent newsletters of "2008", riding a roller coaster, was certainly prophetic. Will 2009 allow a climb *uphill*? The economic picture today is unlike any we have seen, but Uyemura-USA's strategy remains the same as during the 2001 downswing:

**Offer better products and service.**  
**Do not "cut to the bone."** Do not even *think* of reducing customer servicing, or product offerings.  
**Provide the greatest value.**

Our strategy allowed us to greatly expand our customer base eight years ago, and will allow us to do the same during this period of extreme conditions.

We are saddened by the continued closing of major facilities---but have also lived with that reality before. Toppan, Via Systems, and others are gone from these shores, yet we continued to grow, despite the loss of these important accounts. We are confident that our parent company's depth of R&D – combined with our commitment to service – will always allow us to deliver the best value to our customers. Of course, our

ability to provide access to the deep R&D resources of our partners, Umicore-Galvanotechnik (German world leaders in electrolytic golds, anodes, etc.) and MEC (Japan manufacturers of the world's best copper micro-etchants) is something customers value highly as well.

Word of mouth continues to spread, supporting the idea that our strategy works. Despite the severe downturns in 2008, we added more new customers than ever in our history, despite a depressed North American market. 2009 is continuing in that vein, despite the mess we all see.

**To all our customers riding these troubled waters with us, know that we will do everything in our power to assure your success** – both short and long-term. None of us know when the good times will return, but economics are inevitably cyclical and we remain confident in the long-term outlook. Our parent just celebrated its 160th anniversary last November – how many cycles have they seen since . . . 1848?



## Field Experts Form Tex-Mex Powerhouse

Uyemura's footprint in the important Texas and Mexican markets has strengthened – and expanded. An agreement has been reached with AtlanDyess Inc. for the distribution and representation of Uyemura-USA's products in that region.

Included are ENIG, electroless golds, via fill coppers, electrolytic coppers, immersion silver and tins, and electroless palladium. Also covered in agreement are MEC copper micro-etchants; Umicore-Galvanotechnik electrolytic golds, anodes, and Miralloy; and CL Technologies' decorative plating processes, including satin nickel.

UIC's current rep in that important market is Mike Bennett, who has merged his firm with John Helms' and Richard Dyess' company to form this larger group.

As a combined entity, the group will market the Uyemura line, Taiyo solder mask, Asahi dry films, Isola laminants and 3M products – truly a comprehensive solution for companies who want "best in class" products and a way to reduce costs for purchasing and shipping.

 **ATLAN DYESS INC**



# Study of Suitable Palladium and Gold Thickness in ENEPIG Deposits for Lead-Free Soldering and Gold Wire Bonding

Uyemura conducted a study to determine the reliability of lead-free solder joints and wire bonds when ENEPIG is used as the surface finish. Different palladium and gold thicknesses were evaluated and their effects on the composition of the inter-metallic compound (IMC) and the wire bond strength were quantified.

**Electroless Nickel/Immersion Gold (ENIG) is widely used for substrates that require soldering and mechanical contacting.** Although ENIG with increased gold thickness (electroless gold) is a viable finish for gold wire bonding, electrolytic Ni/Au is widely used for this application as well, since concerns remain about ENIG nickel corrosion and impact resistance.

It is well-established that Electroless Nickel/electroless palladium/Immersion Gold (ENEPIG) has excellent solderability for Sn-Ag-Cu-based solders, and forms highly reliable wire bonds.

In our study, ENEPIG deposits were produced to evaluate the reliability of lead-free soldering and wire bond reliability as a function of palladium and gold deposit thicknesses. The data show that high reliability soldering and bonding could be achieved on the same surface with a thickness of 0.02 to 0.1 $\mu\text{m}$  for palladium and as small as 0.2 $\mu\text{m}$  for gold.

## Test Method

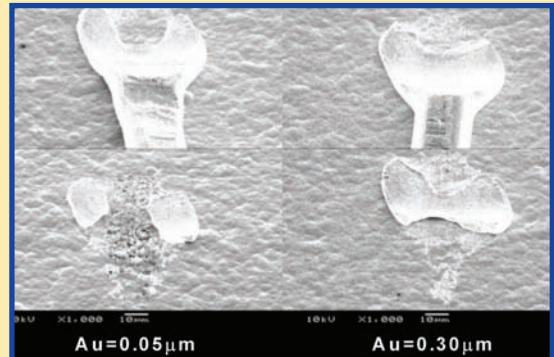
Two test vehicles were used. Both were copper-clad laminate to which a 20  $\mu\text{m}$  thickness of electrolytic copper was plated. For the plating, Uyemura plating processes were used.

## Conclusions

TEM analysis was conducted on test pieces that were aged at 150°C for 1,000 hours after soldering Sn-3.0Ag-0.5Cu and Sn-3.5Ag to ENEPIG deposits.

For Sn-3.0Ag-0.5Cu solder, an alloy layer (Cu,Ni) 6Sn5 with even palladium distribution was identified as the main layer. On the other hand, Sn-3.5Ag solder, revealed a distinct columnar alloy layer (Pd, Ni) Sn4 on the uniform alloy layer Ni3Sn4.

The alloy layer (Pd, Ni) Sn4 apparently degrades solder joint reliability. In addition, solder joint reliability was more dependent on palladium deposit thickness than gold deposit thickness, so it was essential to control the palladium deposit thickness.



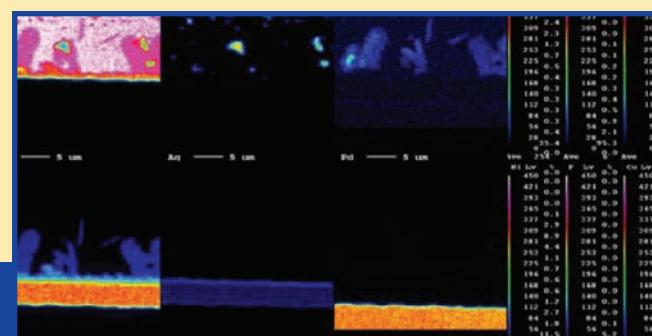
With regard to wire bonding, the ENEPIG deposit will control nickel diffusion to the deposit surface. In this study, the palladium deposit and the gold deposit thickness were varied, in order to determine their impact on wire bond strength. As a result, increased gold thickness has a cushioning effect, and is more effective in enhancing the wire bond strength, compared to increasing the palladium thickness.

Solderability requires proper palladium deposit thickness, while a thicker gold deposit is preferable for wire bondability. Increasing the gold thickness does not improve solder joint reliability, nor does increasing the palladium thickness improve wire bondability.

***It was shown that controlling the palladium deposit thickness and the gold deposit thickness would produce high reliability for both soldering and wire bonding.***

In recent years, electroless plating has garnered attention due to demands for lighter and smaller electronic parts, in addition to lead-free soldering materials. Electroless processing allows finer line definitions and better planarity than electrolytic processes. With a good understanding of how the ENEPIG finish interacts with different lead-free solders, ENEPIG can be a high-performing electroless alternative for today's challenging electronic demands.

*Read the entire study at [www.uyemura.com](http://www.uyemura.com). Click the "Library link," then story #16.*



## Continued from Page 1



The latter award was named for former IPC Board Chairman Peter Sarmanian, and recognizes an IPC member corporation in the printed circuit board industry that has taken a leadership role and made substantial contributions to the industry while supporting IPC through participation in technical and management programs.

**As its motto states, Uyemura is "powered by science and focused on customers."** Every Uyemura employee proudly embodies these values. In order to stay customer-focused, nearly a dozen UIC employees serve on IPC technical committees. Says George Milad, Uyemura national accounts manager for technology and chairman of

the IPC 4-10 and 4-14 committees, "There's no better place to feel the pulse of our industry than serving on an active IPC committee. You cooperate with your market competitors within an engineering and scientific environment, far from the pressure of marketplace competition. And there's nothing more satisfying than being instrumental in the development of a new industry standard."

Don Walsh, Uyemura's Director of Operations and Vice Chair of the IPC PCB Suppliers Council Steering Committee, echoes that sentiment. "In our company, we find knowledge sharing is indispensable to our success. IPC standards are the perfect example of a shared collection of knowledge. If you have knowledge, share it with others in your industry. You just might learn something new yourself."

### Uyemura IPC Participation at a Glance . . .

- > Member since 1994
- > Membership on 14 IPC technical committees
- > 3-11F, UL/CSA Task Group
- > 3-11G, Metal Finishes Data Acquisition Task Group
- > 4-10, Fabrication Processes Committee
- > 4-14, Plating Processes Subcommittee
- > 4-23A, 4-30, Environmental, Health and Safety Steering Committee
- > 4-31, Environmentally Conscious Manufacturing
- > 5-21F, Ball Grid Array Task Group
- > 5-23A, Printed Circuit Board Solderability Specifications Task Group
- > 5-23D, Alternate Final Finishes Task Group
- > 523-E, Tin Whiskers Guide Line Task Group
- > 8-40, Roadmap Steering Planning Committee
- > CCC, Committee Chairman Council
- > TAEC, Technical Activities Executive Council

### About Uyemura

*Uyemura specializes in plating chemistries for the PWB, packaging and decorative industries. Among its specialties are acid copper products, HASL alternative products: electroless nickel/ immersion gold (ENIG), nickel/ palladium/ gold ENEPIG, immersion silver, immersion tin and direct immersion gold (DIG), and copper surface treatments. Uyemura offers a variety of decorative electroless nickel products, including lead and cadmium-free nickel, black nickel and diamond reflective products.*



*"She's out stimulating the economy – can I take a message?"*

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And for this we are very grateful!**

