

# Nova AncoFlex™

## Fully Automated Copper Plating Analyzer

### Proven Performance in PCB / IC-Substrate Manufacturing Environment with Automatic Verification and Calibration

Supports a broad variety of  
copper electroplating chemistries



## Benefits

### Fully Automated Metrology

- Excellent lifetime monitoring of bath composition and performance
- Accuracy and Repeatability – Reported and controlled
- High reliability combined with minimal service needs
- Upgradable to other Copper plating chemistries, as needed

### Low Cost of Ownership

- Low Cost of Ownership – long parts lifetime with low PM cost of
- Small footprint, minimal facilities requirements

### Data Transparency

- All analysis data and information can be extracted by the user for data analysis

#### Low Cost of Ownership

Longer parts lifetime,  
Small footprint

#### Transparent Data Access

User access to all data  
Analog and digital fab links

#### Fully Automated

Accurate, repeatable results  
Upgradeable

# Nova AncoFlex™ Features

## Cu Plating Analyzer – Designed for the PCB industry

- Supports a broad variety of Copper Electroplating (Currently galvanic deposition) Chemistries
- Fully automated analyses of bath components: metal and additives
- Simple operation and maintenance

## Minimizes downtime

- Automatic verification (plausibility check) of results
- Auto Calibration with plausibility function
- Analog and Digital communication to process tools and the Fab
  - RS-232, TCP/IP, Analog 4-20 mA

## Low Cost of Ownership with a Proven Record

## Typical performance in Cu plating processes

Component	Technique	Accuracy (*) [%]	RSD (*) [%]	Analysis time
Copper	Spectrometry	3	2	Total Analysis time < 90 min*)
Acid	Titration	3	2	
Chloride	Titration	3	2	
Accelerator	CVS	7.5	7	
Suppressor	CVS	7.5	7	
Leveler	CVS / Spectroscopy	7.5	7	

\* Chemistry dependent

# Nova Ancolyzer<sup>®</sup>

The Leading Fully Automated Process Control for Advanced Packaging



## Flexible, Scalable Tailored to the Application

### Leading process control for Advanced Packaging

- Electroplating: Cu, Ni, SnAg, Sn, In and Au
- Electroless (e-Less) plating: e-less Ni and Pd, Immersion Au, e-less Au and Cu
- Pre-treatment for e-less plating: wetter, pre-dip, post-dip, Cu-etch, Ni-activator, Al-etch and Zincation

### Flexible, open system architecture

- Full access to collected data
- Enhances characterization, troubleshooting, and process improvement

... characterizes both physical and chemical properties - analyzes **Inorganic** and **Organic** components, **Breakdowns** and also **Bath**

### Performance/Behavior

### Nova Leadership

#### Know-how in chemical metrology and process control

- Proven leadership in the packaging domain
- Broad range of techniques and methodologies
- Seamless chemical fully automated replenishment, bleed & feed and bath make up

#### Delivering exceptional value to the end customer

- Controlling chemical costs and waste reduction due to lower chemical consumption
- Longer consumable parts lifetime and refurbishment options for lowest CoO
- Designed for easy field upgradeability

### Low Cost of Ownership

Longer parts lifetime,  
Efficient footprint

### Transparent Data Access

User access to all data  
Analog and digital fab links

### WLP Best Performance

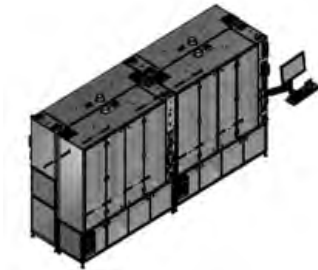
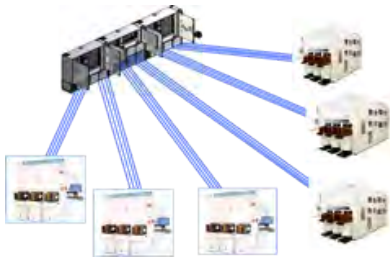
Accurate, repeatable results  
Upgradeable

# A Family of Automated Process Control Workstations

Analysis and dosing systems

Larger complex systems for multiple plating and dosing steps

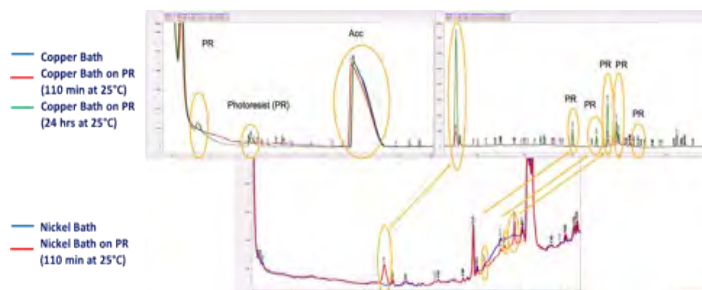
- Up to 5 frames can be combined into one system
- Front access only allows back-to-back positioning



## Nova Ancolyzer<sup>®</sup> Features

- Supports all known chemistries including:
  - Plating: Copper, Tin-Silver, Pure Tin, Nickel and Gold
  - Electroless deposition for Panels and IC-Substrates: Surface preparation (desmear), Electroless Ni, Pd, immersion Au
- The preferred metrology by all major suppliers of Advanced Packaging chemicals
- Analysis of all bath components required for optimal plating
- Intelligent replenishment based on multiple process inputs
  - Replenishment from plating process containers
  - Replenishment from facility bulk
- Seamless DMR integration (CoO lowering solution for low alpha tin/tin silver and Cu plating)
- Precise and validated mixing of Standards, Makeup Solutions, dilutions
- Standards: SEMI S2/S8, F47, CE
- Full fab communications support
- Utilizes chemical vendors' containers, Nowpak ready, Barcode assisted
- SW GUI includes data analysis, logs and reports, graphic SPC and preventive maintenance

### Bath Lifecycle Contaminants analysis



# Nova AncoScene®

Back-End-Of-Line  
Interconnects Metrology  
for Damascene Plating



## Benefits

- Automated online analysis of inorganics, organic additives and byproducts
- Smallest footprint and fab space
- Simple, convenient front access
- Cu & Acid - non reagent analysis (NRA)
- Connection to all typical plating tools
- Automatic Standard mixing with self-check provisions
- Barcode verification system for bottle changes
- Supports NowPak containers
- Long parts lifetime and refurbishment options for lowest CoO

### Low Cost of Ownership

Longer parts lifetime,  
Small footprint

### Transparent Data Access

User access to all data  
Analog and digital fab links

### Fully Automated

Accurate, repeatable results  
Proven, successful delivery  
record

# Nova AncoScene<sup>®</sup> Features

- Supports all copper chemistries
- Optional Bath Health/Performance Indicator
- Precise and validated mixing of Standards
- Safety Standards: SEMI S2/S8, F47, CE
- Communication protocols: TCP-IP, RS-232, SECS/GEM
- Containers: Nowpak ready, Barcode assisted container replacement system
- SW GUI includes: data analysis, logs and reports, graphic SPC and preventive maintenance
- Slip-Streams: up to 4 tanks
- FM-4910 compliant material
- MTBF > 2160 hours; MTTR ~ 2 Hours
- Footprint: 810mm W x 610mm D



## Analysis Performance – Cu Damascene

Component	Technique	Accuracy [%]	RSD [%]	Analysis time
Copper	Spectrometry	2	1	Total time 30min*
Sulfuric Acid	Non-Reagent	2	1	
Chloride	Titration	3	2	
Accelerator	CVS	3	2	
Leveler		3	2	
Suppressor		3	2	

\* Bath chemistry dependent



# Nova DMR<sup>®</sup>

Direct Metal Replenishment  
for sustainable and cost-effective  
metal plating



The only clean room ready Metal-oxide  
replenisher for OSATs and Fabs

Perfectly supplements inert anode processes:

- Improved uptime by reducing the need for periodic anode maintenance
- Eliminate issues with plating uniformity at high anode utilization rates such as PLP, RDL, Sn Bumping
- Seamlessly integrated in Ancolyzer system



## Reliability

- Economical and shelf stable metal source
- Reliable supply chain by qualified CuO/SnO material vendors

## Waste Reduction

- No bath volume increase like with liquid replenishers
- Controlled acid levels mean longer bath life  
Significant decrease of waste volumes during bath operation



### Sustainable

Minimizes chemical waste  
Longer bath life  
Retrofit existing Ancolyzers



### Patented Technology

The only Powder Doser for  
OSATs and Fabs



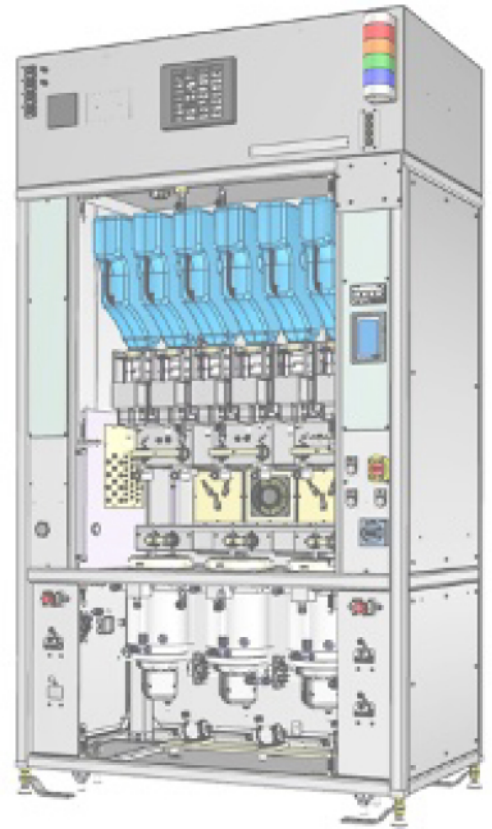
### Cost Savings

Substantial cost reduction for  
Advanced Packaging  
applications

# Nova DMR® Features

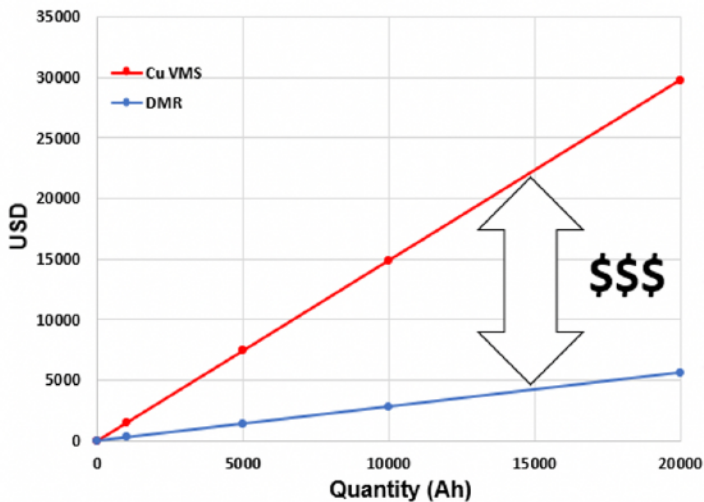
## Optimizes High Volume Metal Plating Processes

- Available for Cu and Sn electroplating baths
- Supports up to 3 DMR Stations per frame
  - One tool can supply multiple platers
  - Increase throughput by merging DMR Stations
  - Parallel supports CuO and SnO stations in one frame
- High-capacity containers
  - 10kg CuO: replenish up to 365 g/hr per DMR Station
  - 5kg SnO: replenish up to 225g/hr per station, SnAg and Pure Sn applications
- Secure material management via Container RFID
  - CoA Information
  - Material, Lot & Product No.
  - Tracking of Lot history, expiration dates
- Complies with Safety Standards Semi S2/S8, F47, CE
- Multiple qualified material vendors



**Waste volume reduction up to 320L/day\***  
**Up to 70% direct cost savings in Advanced Packaging\*\***

Cu Replenishment by DMR vs. VMS - CoO Calculation



- H<sub>2</sub>SO<sub>4</sub> level remains constant on a set level
- Bath volume stays steady without significant increase, thus preventing frequent bleed
- Stable Cu source
- Very long shelf-Life in a solid state