Elemental Scientific
Radian VPD-ICPMS

VPD-ICPMS Production Tool

Integrated VPD-ICPMS for Monitoring Silicon Wafer Surface Contaminants

Radian 7
VPD-ICPMS

ICP | ICPMS | AA

High-throughput Production VPD-ICPMS

The World's Most Productive Online VPD-ICPMS

The Radian VPD-ICPMS is a high-throughput, completely automated production tool for online monitoring of metal contamination on semiconductor wafers with ultra-low detection limits and complete recovery of metals. The Radian's **all-in-one process module** design, **ultrafast scanner**, and **fully integrated ICPMS** makes it the fastest, most automated VPD-ICPMS in the world.

Two High Productivity Models

Radian 7 VPD-ICPMS – Parallel dual-wafer processing

Radian 3 VPD-ICPMS – Compact and versatile single wafer processing

All-in-one Process Module

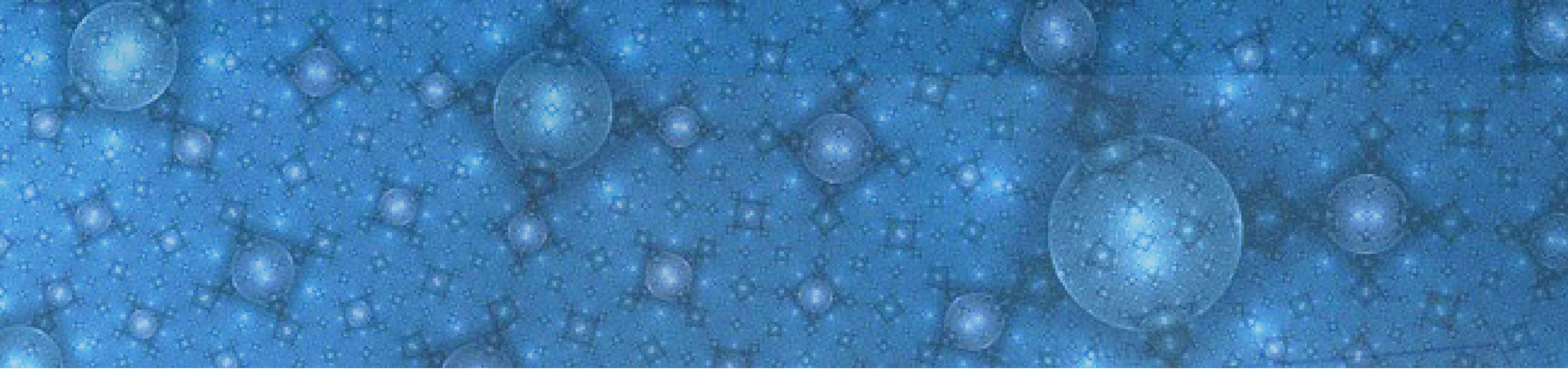
Wafer VPD, scanning, cleaning and drying all take place without transferring the wafer. The elimination of individual chambers saves space and time, and minimizes contamination that takes place when wafers are transferred.

Ultrafast Scanner

The innovative radial scan nozzle covers the wafer's full radius. A 500 μL drop of scan solution is stretched along a linear scan nozzle to collect metal contaminants from the wafer surface. Wafer scanning takes about 60 seconds for a complete 720° scan.

Fully Integrated ICPMS

After the wafer is scanned the solution is transferred directly from the radial scan nozzle to an enclosed ICPMS, further reducing the risk of contamination.



Online Semiconductor Wafer Monitoring

High Throughput

- Innovative radial fast-scanning nozzle
  - Scans wafer surface in 60 seconds or less
- All-in-one Process Module
  - VPD, scanning, cleaning and drying
- Edge, bevel, front-side and back-side scanning options

Radian 3
VPD-ICPMS

Fab Integration

- Fully automated with OHT capabilities
- Direct bulk chemical connections
- 24/7/365 unattended operation
- SECS/GEM communication

High Performance

- Hydrophilic wafer scanning
- Immediate transfer and analysis of scan solutions
  - Eliminates risk of contamination or evaporation from separate vessel
- Ultra-low 10^5-10^8 atoms/cm^2 detection capability
- Inline preparation of scan solution
- On-demand chemistry formulas based on wafer types for complete recovery

Cross-verification

- Combine Radian VPD-ICPMS with scoutDX to control and cross-verify Fab metal contamination

Pure Simplicity

Wafer VPD, metals scan, cleaning and drying all take place in one process module, saving time and minimizing the risk of wafer cross-contamination

Single Process Module

The process module performs wafer VPD, metals scan, cleaning and drying without the wafer being transferred.

Multiple scanning configurations are available including edge, bevel, front-side and back-side scanning.

The Radian 7 has two process modules to further increase throughput.

Radian VPD-ICPMS Sequence

1) OHT (or user) places a FOUP/FOSB on the EFEM

2) Wafer is transferred to a process module

3) Wafer undergoes VPD process

4) Scan solution is created and transferred to the scan nozzle

5) Wafer undergoes metals scan

6) Scan solution is transferred directly to the ICPMS

7) Wafer undergoes cleaning and drying processes

8) Wafer is returned to the FOUP/FOSB

Data Verification with scoutDX

scoutDX

The scoutDX is a real-time online monitor of metal contamination for all semiconductor chemicals. It can immediately detect trace impurities in chemicals being delivered before they are accepted. It also monitors process and supply chemicals for the Fab, and any other liquids including UPW for ultra-trace impurities.

Radian VPD-ICPMS

The Radian VPD-ICPMS is an online monitor of metal contamination on semiconductor wafers. The single process module design, inline preparation of scan solution and fully integrated ICPMS produce the most accurate data.

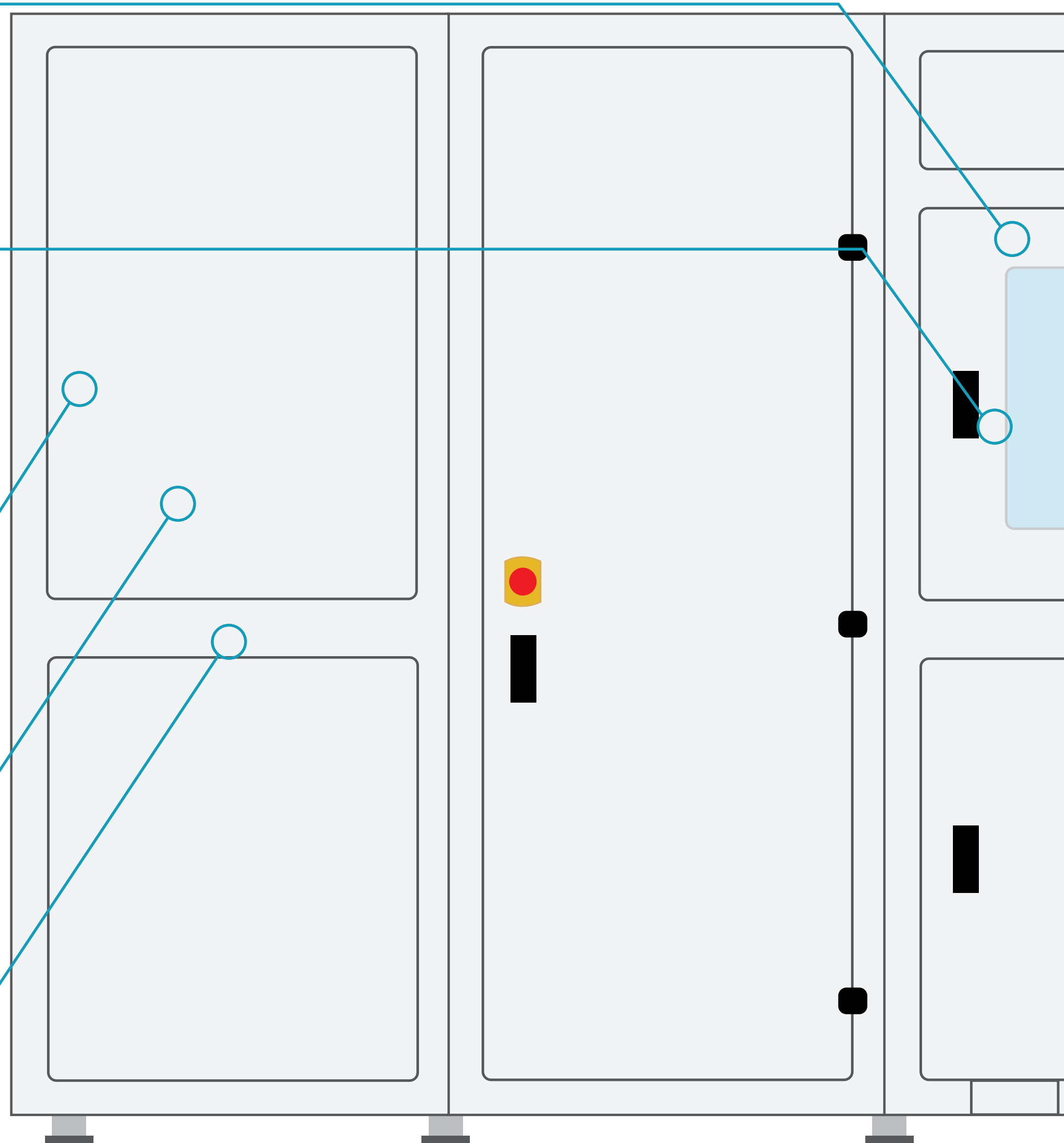
Combine to Control & Cross-verify Contamination

Online analysis and SECS/GEM reporting of both wafers (Radian) and process chemicals (Scout) provides the information necessary for tight control of metal contaminants throughout the Fab.

Radian Features Diagram

Process Module

Performs wafer decomposition (VPD), scanning (edge, bevel, front-side and back-side), rinsing and drying
(The Radian 7 has two process modules)



Scan Nozzle

Scans wafer surface in 60 seconds or less
(Multiple scanning configurations are available including hydrofillic, edge and bevel scanning)

Fully Automated and Integrated Single or Triple Quad ICPMS

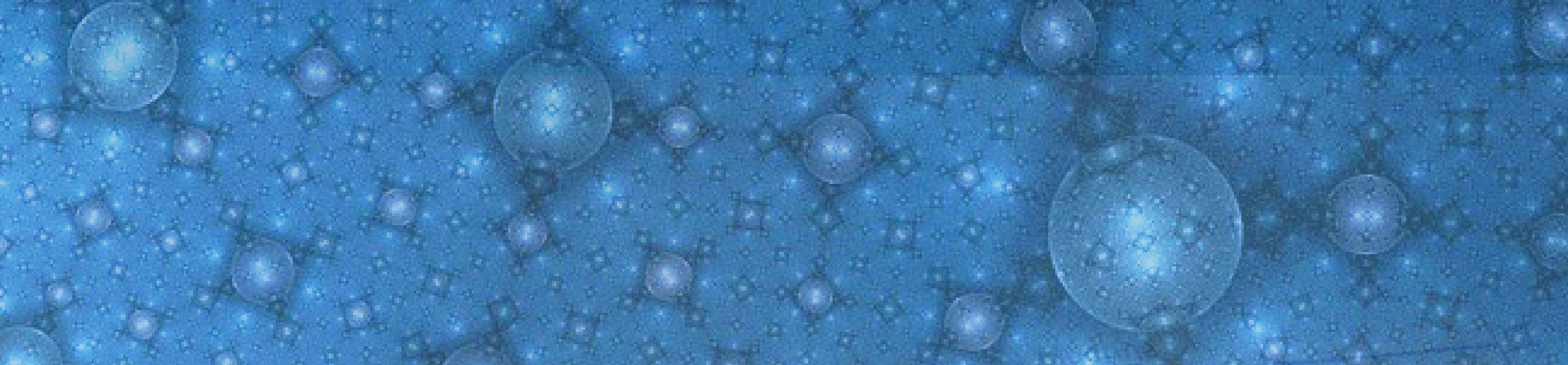
- Automatically calibrates
- Directly transfers samples from scan nozzle to ICPMS
- SECS-GEM data reporting allows integration with scoutDX and cross-verification of metal contamination

High Purity Autosampler

In Fab ICPMS analysis

Electronics Cabinet

Redundant mirror data storage



Ultra-clean Exhausted Enclosure with Air Shower

Ensures ultra-pure environment for ppt analysis

Status Indicator Light

Alerts user to system problems (leaks, empty reagents, etc ...)

Ultra-clean Exhausted Enclosure with Air Shower and Ionizer

Ensures ultra-pure environment with ion removal for ppt analysis

Triple or dual port EFEM

Increases throughput and is integrated to wafer aligner and process module

Light Curtain (Optional safety feature)

Stops a FOUP from descending when the light curtain is breached

User Interface

Wafer Aligner

Ensures precise and accurate loading with vacuum grip

Ultra High Purity Syringe Module

Automatically prepares scan solution

Elemental Scientific

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