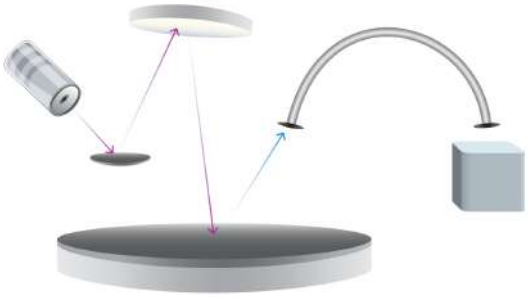
NOVA VERAFLEX® IV

The Next Generation of Faster, High-Precision In-Line XPS and XRF Materials Metrology

MEET NOVA VERAFLEX®

The Nova VERAFLEX has revolutionized inline materials metrology and is the industry standard for XPS and XRF materials characterization

- Substantial throughput improvement while maintaining precision performance
- Higher signal to noise performance revealing novel SPC process control capabilities
- Enhanced beam control compatible with smaller pad requirements
- New spectral optimization techniques deliver improvements in tool to tool matching
- Simultaneous XPS and XRF for In-line and In-die applications
- Reduced preventive maintenance cycles and advanced on-board diagnostics



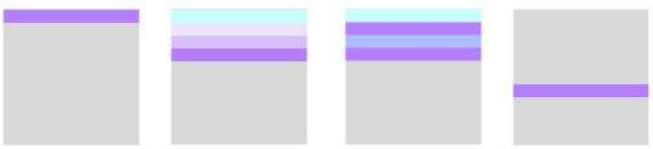
ADVANTAGES OF X-RAY PHOTOELECTRON SPECTROSCOPY (XPS)

- Surface-sensitive technique
- Identification of the chemical element and bonding state
- Direct quantification of number of atoms in the film
- Simultaneous thickness and composition without correlation

VERAFLEX VALUE PROPOSITION

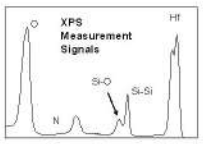
Direct Measurement

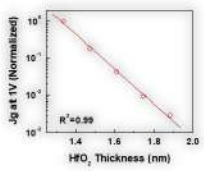
Precise Thickness and Composition Metrology



In-Line Control

Early correlation tracking to E-Test Performance



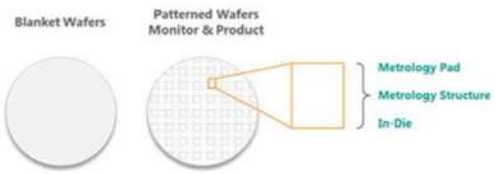


Simultaneous XPS and XRF

Simultaneously leverage both techniques at the same location

Precision where you need it

The Industries most precise In-line XPS



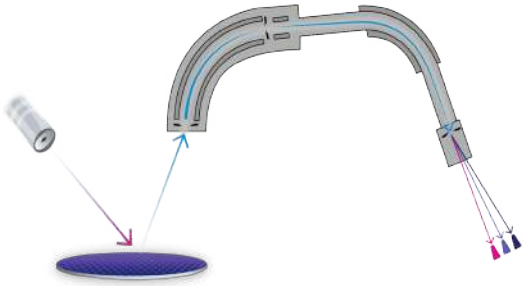
NOVA METRION®

The first in-line SIMS for statistical process control (SPC) of compositional profiles

MEET NOVA METRION

METRION is a fully-automated SIMS product validated for in-line production process control. Nova METRION® takes repetitive measurements out of the lab and into the fab where the time-sensitive information is critical for SPC.

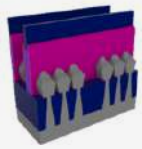
- SIMS technology enabling quantitative compositional profiling tailored for the fab
- Fully-automated, recipe-driven, 300mm HVM-ready
- Designed for process control of complex film stacks for logic and memory
- Fast, reliable, and repeatable SIMS data
- Validated on various high-value use cases for logic and memory



ADVANTAGES OF SIMS (Secondary Ion Mass Spectrometry)

- Direct, inline measurements
- High depth resolution and data density
- Built-in film analysis & recipe management
- Full factory automation for HVM
- Whole wafer SIMS eliminates sample prep

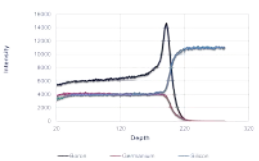
METRION APPLICATION SPACE



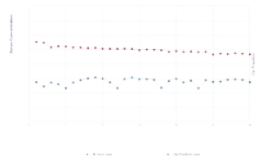
Dopant Concentration

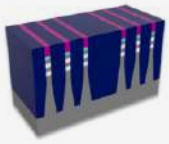
SIMS is Critical for Epi performance for chamber matching, tighter process control, and increased uptime

Boron Concentration Profile in SiGe



Automated Epitaxy SPC

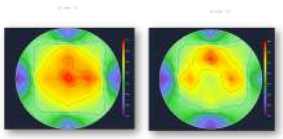




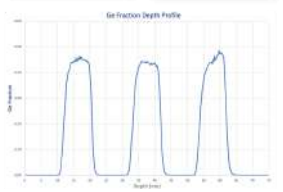
Deposition Uniformity

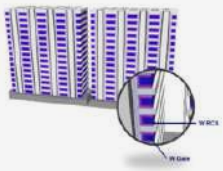
SIMS monitors Ge concentrations to ensure uniform deposition on each nanosheet and across the wafer

In-Line Germanium Deposition Uniformity Across Wafer



In-Line Germanium Deposition Uniformity Across Wafer

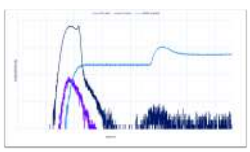


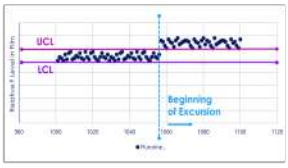


Contamination Detection

SIMS quickly determines the presence, concentration, and location of contaminants In the entire film stack.

Cl & F Concentration Depth Profile





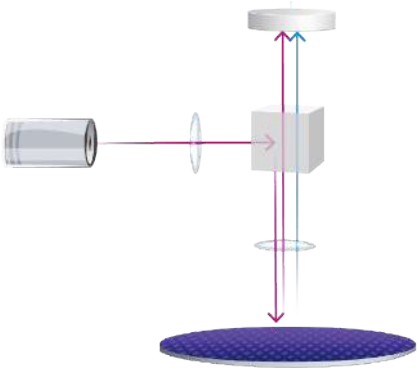
NOVA ELIPSON™

Optical Material Metrology platform implementing Raman spectroscopy in the fab

FULLY AUTOMATED INLINE RAMAN PLATFORM

The Nova ELIPSON™ is a high-end standalone metrology system, optimized for measuring material properties such as composition, strain, crystallinity and surface properties, for both memory and logic segments

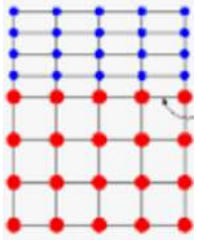
- Fully automated, 300 mm HVM-ready platform
- Designed for advanced 3D applications: GAA, FinFet, 3D-NAND and DRAM
- Multiple wavelength source with high brightness
- Small spot suitable for in-die metrology
- Wide spectral range with high spectral accuracy and precision



ADVANTAGES OF RAMAN SPECTROSCOPY

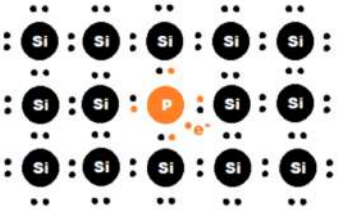
- Fast and non-destructive
- High depth Resolution and data density
- Small spot size for in-die analysis
- Full factory automation for HVM

ELIPSON APPLICATION SPECTRUM

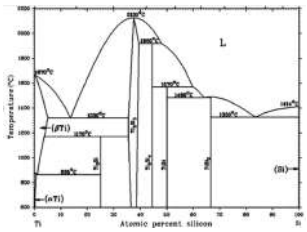


Strain

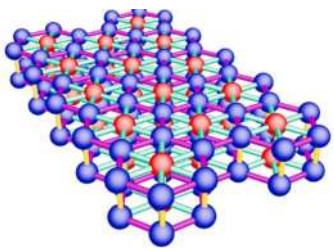
Crystallinity



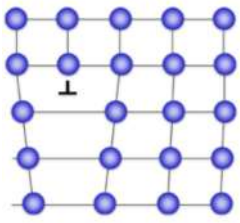
Doping Level



Material Phase



Composition



Lattice Defects