



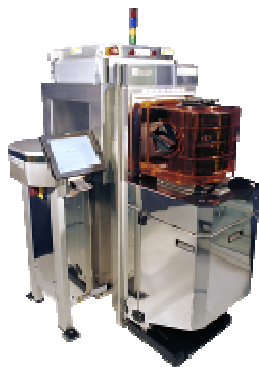
# Metryx mentor

## A NEW GENERATION OF METROLOGY TOOL BASED ON INNOVATIVE MASS MEASUREMENT

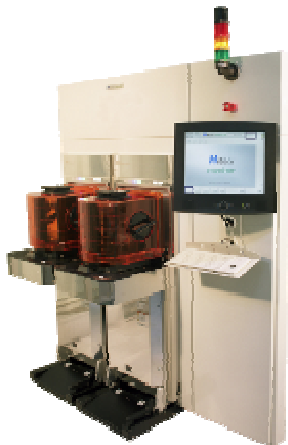
MASS AS AN IN-LINE RESPONSE HAS BEEN ADOPTED BY MAJOR MANUFACTURERS OF BOTH LOGIC AND MEMORY DEVICES AT ADVANCED TECHNOLOGY NODES.



mentor OC23



mentor SF3



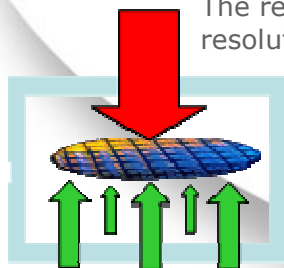
mentor DF3

- ◆ Metryx is a UK based innovative metrology company
- ◆ Mass metrology provides a unique measurement of the mass change resulting from any process step
- ◆ Mass change is a fundamental measurement of the change induced on a wafer by a process step
- ◆ Measuring mass change is a measurement of process performance and an easy to implement fast indicator of process trends and outliers
- ◆ Low cost of ownership derived from high reliability, with no consumables required
- ◆ On product wafer measurement reduces or eliminates the need for test wafers
- ◆ Measures Etch, Deposition, CMP, Metals and Dielectrics
- ◆ Proven technique for monitoring of processes with no false flags allowing process control through SPC/APC

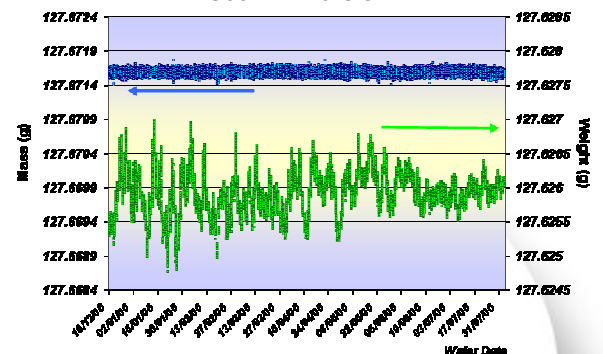
### MASS METROLOGY: REPEATABLE AND PRECISE

Metryx mentor technology is based on a thorough understanding of the forces behind the inaccuracy and variability in traditional weight measurement. Through the use of force measurement, environmental measurement and precision engineering these variable forces have been removed.

The result is a mass measurement with a resolution of 10µg and a dynamic repeatability of 80µg (1σ) equivalent to less than 1Å blanket film of tantalum on a 300mm wafer.



Mass & Weight Repeatability Data  
300mm Wafers



**STI TOP CORNER ROUNDING**

- TCR is a key process step for transistor performance
- Mass Metrology can check process repeatability of TCR on the product wafer

**GATE ETCH**

- A critical process step for device performance
- Mass Metrology can provide immediate feedback on process repeatability for a CD change of <1nm across the wafer

**HIGH ASPECT RATIO ETCH**

- Measuring HAR etch repeatability, cost effectively, is difficult
- Mass Metrology is very sensitive to surface area providing reliable, accurate trend data on etch process chamber performance

**STACKED MATERIALS**

- Measuring very thin stacked dielectric (capacitors) or metals (electrodes) on product wafers can be addressed by Mass Metrology
- An example is Ta/TaN used for advanced barrier layers in a Cu DD scheme, where Metryx can report thickness changes <0.1nm

**THROUGH SILICON VIA (TSV)**

- Measure etched silicon confirming etch depth profile stability
- Confirm step coverage of oxide liner
- Accurate measurement of multi stack barrier seed layer
- Determine effective sidewall coverage
- Monitor copper - ECD fill process

**DEPOSITION MOISTURE ABSORPTION/DESORPTION**

- Quantitative measurement of moisture out gassing and uptake for low k films
- Queue-time effects and post-etch degradation due to moisture damage

**AIR GAP FOR LOW K**

- Advanced node low k process
- Qualifying the repeatability of material removal in the air-gap process

**ADVANCED DEVICES**

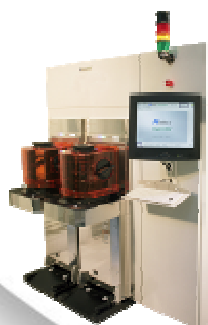
- Critical step monitoring in MuGFET device fabrication
- Complex gate stack formation (HfSiO/ TiN/ PolySi)
- Monitoring nMOS extension implants by plasma doping
- Selective Epitaxial Growth of PolySi on Fins

**BULK ACOUSTIC WAVE DEVICES**

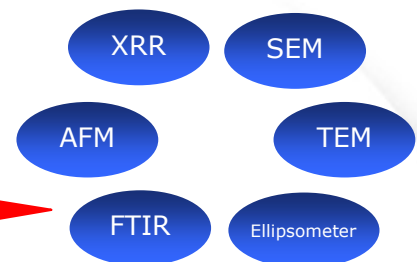
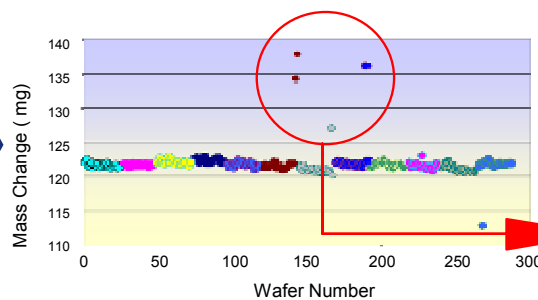
- Key material properties such as acoustic impedance
- Measurement of the AlN piezo electric layer
- Mass loading of the resonator by the final passivation
- Monitoring the reflector layers

**ADVANCED APPLICATIONS**

- High k/ Metal Gates
- Nitride stress for strained nitride gates
- Surface cleaning and polymer removal



*Monitor your process, Analyse your problems...*



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*...rethink your Metrology*