

PolyScanner System for 2D Thin Film Inspection

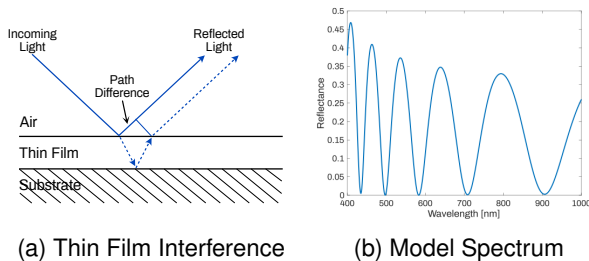
Background

Thin film are an integral part of semiconductor technology. Thin films can be made from a vast variety of materials and their thickness can range from just a few atomic layers as in gate oxides to several micrometers as in the case of piezoelectric layers for surface acoustic wave filters. In many applications the thickness of the film determines its functional properties. Hence precise thickness control is important for optimal production yield.

The PolyScanner system is a high speed reflectometry system that allows for high speed 100% inspection of wafers. Its optics covers a 300 mm wafer with more than 750.000 measurement points, each 300 μm by 300 μm in size. High power software algorithms then calculate a wafer thickness map.

Measurement Principle

As figure 1a illustrates, thin film interference occurs because there is a path difference between light reflected at the top and bottom interface of a thin film. This path difference leads to a wavelength dependent interference pattern that is visible as a sinuoid in the spectrum. The right part shows the calculated interference for a 805 nm thick layer of Silicon Nitride.



System View

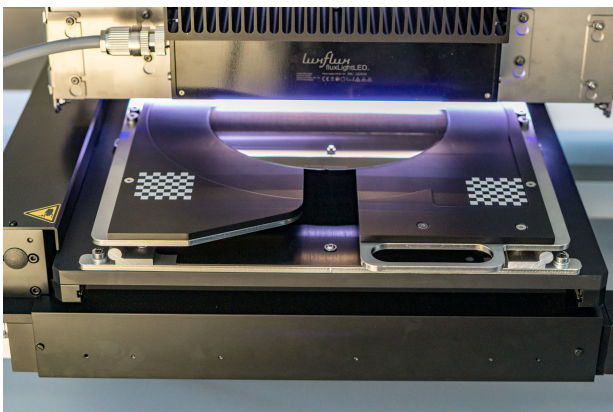


Figure 2: PolyScanner with loaded 200 mm wafer

Test Measurements

The PolyScanner system comes with a powerful software suite that allows for control of the device and insightful data analysis. The PolyScanner works for single and multi-layer thin film stacks and supports various dispersion models.

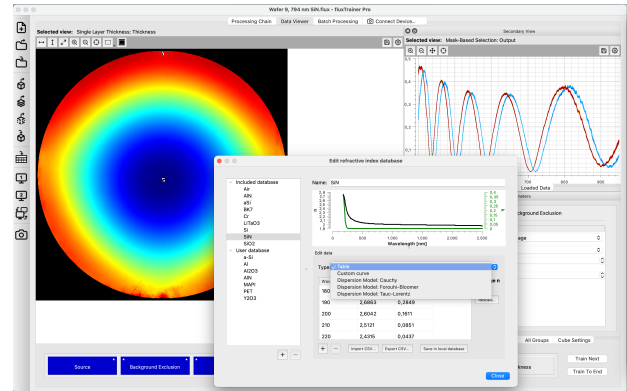


Figure 3: Screenshot of the Data Analysis Package

Figure 4 shows the results from a 200 mm Wafer covered with a silicon nitride layer

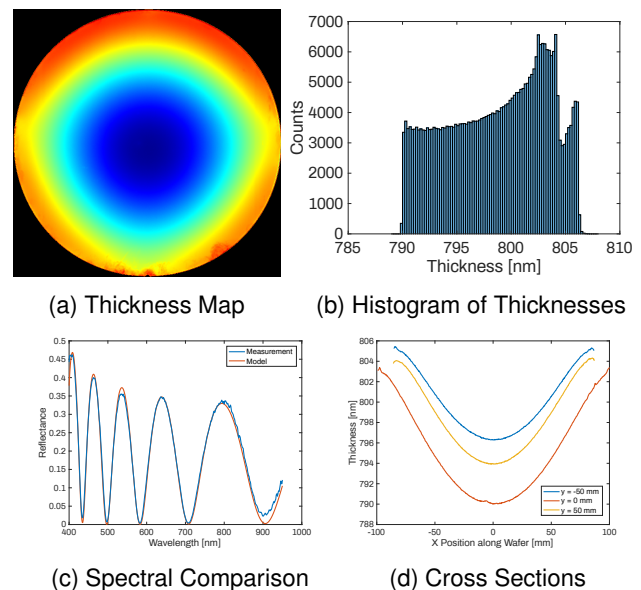


Figure 4: Results of a Silicon Nitride Test Wafer

Contact

If more information or specific requests are needed please feel free to contact us.

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