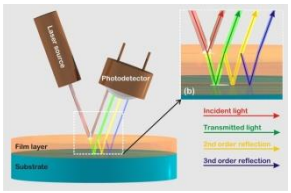
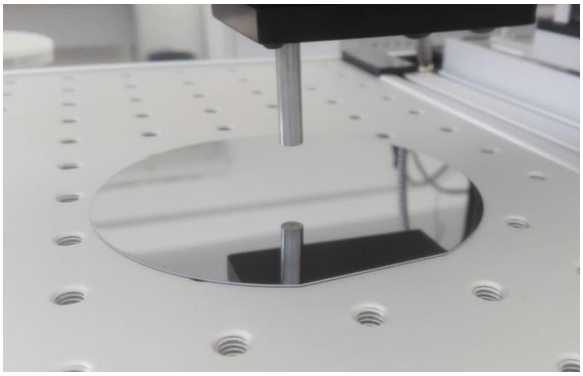
ThetaMetrisis APPLICATION NOTE #029

Silicon Wafer thickness measurement



Introduction: Silicon is an indispensable element of, and a foundation layer in, semiconductor wafer manufacturing. It is essential to know the geometrical thickness of a silicon wafer accurately for quality control and process management of the manufacturing process[1]. In this application note we measure the thickness of a Silicon wafer using FR-Tools.

Means & Methods: Sample for characterization was a standard 4inch Double-Side Polished Si wafer. Reflectance measurements were performed by using **ThetaMetrisis FR-Basic NIR**, tuned to operate at the spectral range of 1500 – 1580 nm, as shown in Figure at right.



Results: Typical experimental (black line) and fitted reflectance spectra (red line), as recorded on the FR-Monitor software, of the Si wafer, are illustrated in **Figure 1.** The fitting was applied in the 1500-1560 nm spectral range, and the thickness of the Si found to be 497.4 μm.

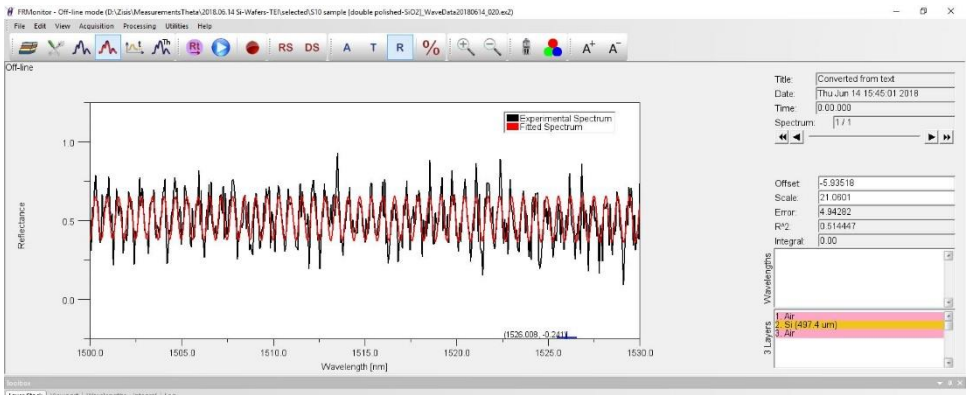


Figure 1): Specular Reflectance of a 4inch **Si wafer** as recorded by FR-Monitor. **Thickness measured at 497.4 um**

Conclusions: Thickness measurements of Si wafer substrates have been demonstrated using FR-Tools.

[1]J. Jin, J. W. Kim, C.-S. Kang, J.-A. Kim, and T. B. Eom, "Thickness and refractive index measurement of a silicon wafer based on an optical comb," Optics Express, vol. 18, no. 17, p. 18339, Aug. 2010.