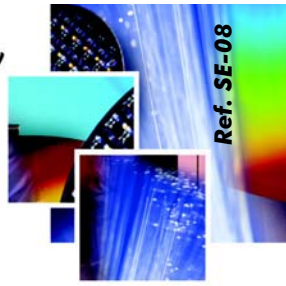

Ref. SE-08

Application Note

Characterisation of DNA Sensor Pads using the UVISEL Spectroscopic Phase Modulated Ellipsometer

UVISEL

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The samples characterised in this study were DNA sensor layers mounted on a silicon wafer, with an oxide layer linking the sensor layer to the wafer. The index contrast between the linker and DNA sensor layers was very small, and very high sensitivity measurements were necessary to complete the characterisation.

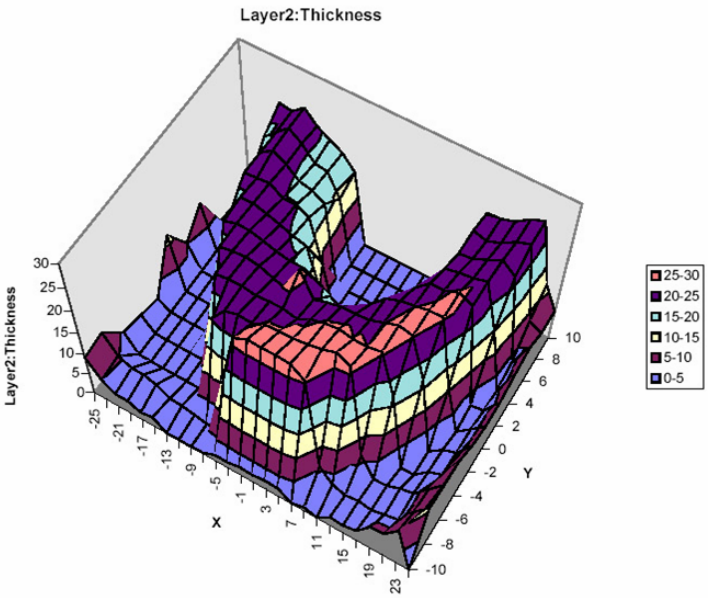
The instrument used was a UVISEL ellipsometer fitted with microspot optics and automatic XY mapping stage. The wavelength range used was 240 – 830 nm. All measurements were made at an angle of incidence of 70°. The spot size used was 50 μm, a standard size with the UVISEL ellipsometer instrument. A key feature of the microspot optics is that they are achromatic, allowing spectroscopic acquisition and sample mapping without compromising the analytical data.

In the first instance the silicon wafer with oxide layer was characterised. The wafer was then patterned with a DNA sensor layer and the sample characterised by stepping the sample stage in the X and Y planes to generate the using the following model structure.

Layer 2: DNA Sensor	Calculated
Layer 1: SiO_2	1244 Å
Substrate c-Si	

The sample data is summarised in the figure. The thickness of the DNA sensor pad was found to be of the order of 20 Å. This is consistent with the preparation of a layer of single molecular thickness as expected.

The pads characterised had a variety of shapes. The example chosen here had a ring shape. The area covered by the analysis is 50 mm x 20 mm.



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