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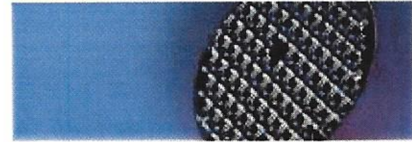
Ex-Situ UVISEL Ellipsometer



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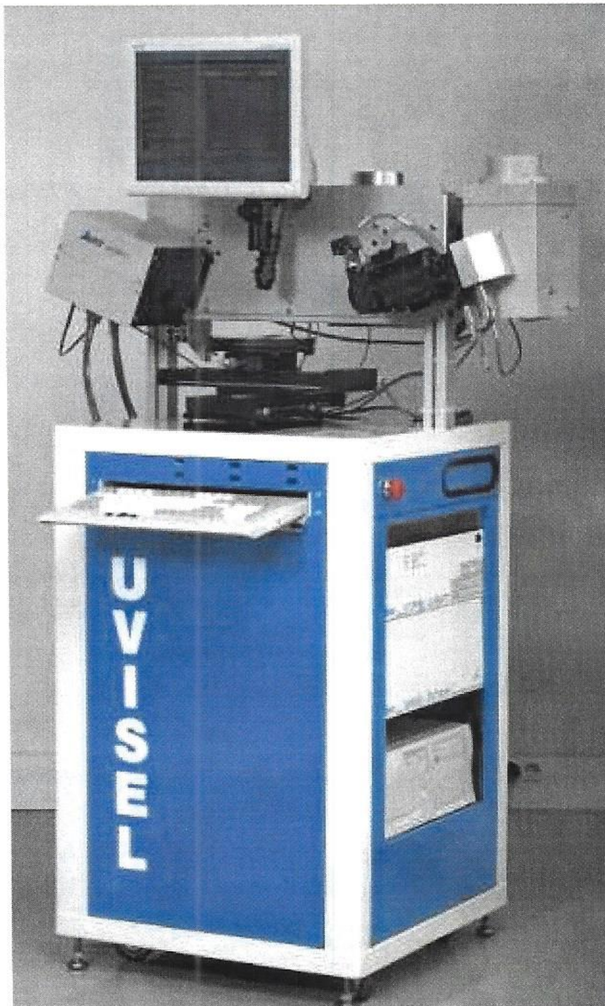
Principle

Spectroscopic ellipsometry is a non-destructive, optical technique for characterising the physical, optical and material properties of thin films and structures. The technique is based on measuring the change in light polarization upon reflection from a sample surface or interface, and allows characterisation of thin film optical and structural properties with extreme accuracy.

The spectroscopic capability allows for simultaneous determination of multiple parameters for single and multilayer film stacks. The information provided includes:

- Film thickness (d) for single and multiple layer films. Using the UVISEL ellipsometer films from a few Angstroms to tens of microns may be characterised using the UVISEL phase modulated ellipsometer.



- Optical constants where the real (n) and

imaginary (k) parts of the refractive index for one or more films present in the structure may be determined.
- Reflectivity and Transmission data.
- Chemical composition - for example the composition of Si1-xGex layers.
- Crystallinity and microstructure - for example the ration of polysilicon to amorphous silicon.
- Film uniformity by area and depth.
- Characterisation of layers with a graded index and birefringence.

The Jobin Yvon range of UVISEL ellipsometers combine phase modulation with and an entirely numerical data acquisition and processing system. These features allow for a robust design with no mechanically moving parts, and for rapid and precise measurement.

The UVISEL spectroscopic phase modulated ellipsometer has a very wide wavelength range with excellent sensitivity in the far-UV and near infrared parts of the spectrum. The very high precision of the instrument and its working range allow the UVISEL instrument to be used in a wide range of applications for both ex-situ use and for in-situ monitoring of deposition and / or etch processes.

At the bottom of this page we have highlighted some applications of the UVISEL range of ellipsometers. During the coming months we will be making application notes available for many of these applications. If you would like to see some information before we have posted it to the website please fill in the contact form.

Single or Multilayer Characterisation

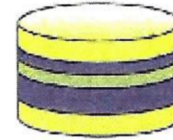
- Film thicknesses

- Optical properties : refractive index, absorption coefficient
- Chemical composition (SiGe, AlGaAs, HgCdTe...)

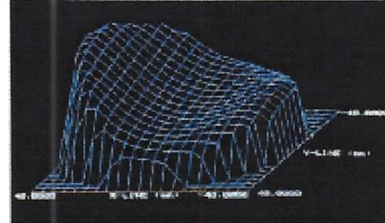
- Graded layers
- Birefringent layers
- Crystallinity (polysilicon, a-Si)
- Multilayer structures (SOI, SIMOX, LED, lasers, VCSEL, HBT, HEMT)
- Buried layers investigation
- Surface roughness
- Damage and contamination
- Layer uniformity by area and depth using mapping accessory

SOI Structure determination in less than 6s. with multiguess routine

30 Å native oxide
0.57 µm c-Si
0.33 µm SiO_2
0.24 µm polysilicon
0.65 µm SiO_2
c-Si



and surface layer mapping in 6 min.



Features

- Submonolayer thickness resolution (self assembled monolayers, native layers, surface contamination).

- Millisecond time resolution.
- Spectral range available : 250 to 830 nm standard, extended optics in options.
- Microspot : 50,100 or 1000 microns spatial resolution.
- Class 1 certified clean room compatible.
- Goniometer with selectable angle of incidence 40-90 degrees.
- Transmission measurements.
- Unique horizontal sample holder design (for easy wafer handling).
- Autocollimator.
- Compact and modular design with benchtop and cabinet mounted versions.

Options

- Near-IR extension up to 1.7 microns.

- Far UV extension down to 190 nm.
- Multi-wavelength capability - simultaneous

acquisition of 32 or 64 energies in the spectral range.
- Large stage mapping : up to 8" wafers or 500 x 500 mm plates.
- Ultrafast X-Y mapping stage : 50 spectral points / minute on 8" wafer.

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