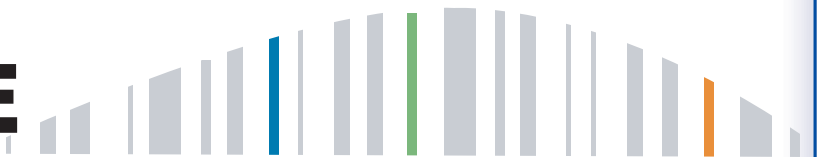


Angstrom Advanced

# PHE-VADE

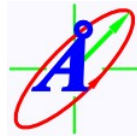


**PHE Variable Angle Discrete Wavelength Ellipsometer**  
**Angstrom Advanced**

Instruments for Thin Film and Semiconductor Applications

[sales@angstromadvanced.com](mailto:sales@angstromadvanced.com)

[www.angstromadvanced.com](http://www.angstromadvanced.com)



## **VARIABLE ANGLE DISCRETE WAVELENGTH ELLIPSOMETERS**

*PhE-VADE is the latest discrete wavelength ellipsometer with many new features, such as full materials library, widest variable angle, second laser for alignment and very powerful software making the instrument highest precision and repetition.*



### **Upgrade Options**

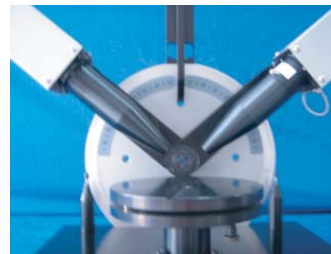
*Micro spot can be carried out on sample areas smaller than 50 microns by 50 microns. Sample areas with small lateral dimensions can be analyzed using the micro spot option together with a mapping option.*

*Multiwavelength: 470 nm, 532 nm, 543 nm, 594 nm, 612 nm, 633 nm, 1064 nm and 1150 nm, or by request*

### **Available Sub-Models**

**D:** Discrete wavelength ellipsometer

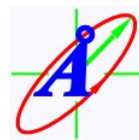
**M:** Multiwavelength ellipsometer



### **Nondestructive Characterize Thin Films and Bulk Materials**

- *High Signal-to-Noise ratio suitably operated in most environment*
- *Fast measurement speed of less than 1s suitable for in-situ process monitoring and control*
- *Any substrates: transparent, metallic, semiconductor, etc;*
- *Widest coating films, single or multilayers;*
- *Second laser to make alignment much convenient and accuracy*
- *Powerful software with large library of material optical constants*
- *High stability and reproducibility of measured angle better than 0.01 Degrees*
- *Auto focus compensates for sample topography and wafer 'bow' misalignment*
- *Wide variable angle 20-90 degree to simultaneously determine film thickness and optical constants*
- *Multiwavelength combined operation to obtain refractive index dispersion*





## PhE-101D



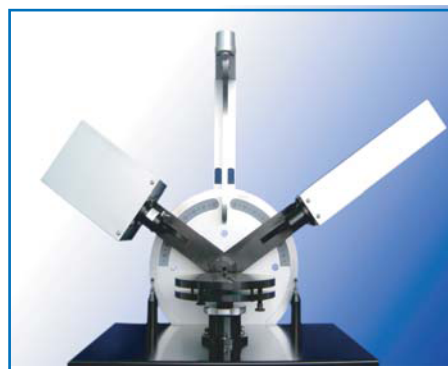
*PhE-101D is a high speed discrete wavelength ellipsometer designed for measuring the refractive index and thickness of thin films. The PhE-101D takes quick and accurate readings due to its precision optical analyzer/detector and its stable mechanical design. The ellipsometer is supplied complete with integrated acquisition and analysis Windows software package, which further enhances the speed and ease of use of the instrument.*

*The variable angle is adjustable in steps of 5 degrees, with an accuracy of 0.01 deg. (As an option, the angle of incidence can be automated.)*

*The PhE-101D is very easy to use and can be fitted with our new laser alignment tool which greatly improves the ease of use and speed of operation when compared to conventional ellipsometers.*

## PhE-101 M

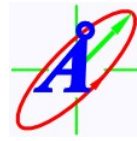
*PhE-101M is a multiwavelength ellipsometer designed for unique determining the refractive index and thickness of thin films. It provides refractive indices at discrete wavelengths and their dispersion. Up to 8 discrete wavelengths are available.*



## PhE ACQUISITION AND ANALYSIS

*The WINDOWS 98, ME, 2000, XP operating software features pull-down menus and help functions. The software package calculates  $n$ ,  $k$ , and  $d$  for substrates, single films and multi-layers. The user can store models and simulation curves that are used for calculation. Data can be entered from the ellipsometer, the keyboard or an external file. An interactive program for calculating multi-layers is also included.*

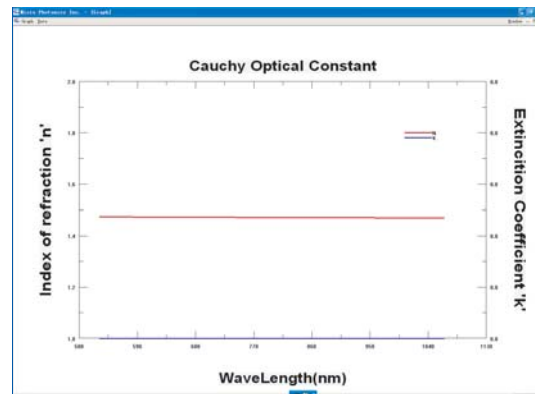
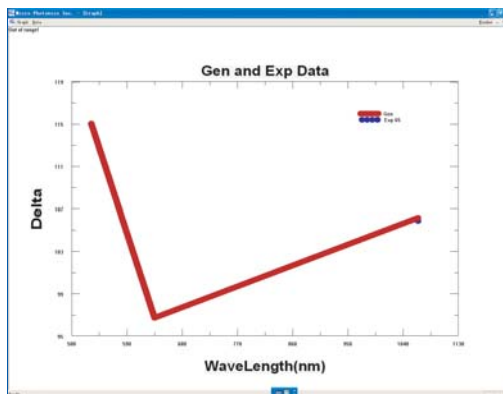


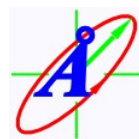


- Integrated data acquisition, analysis software
- Full materials library
- 2D and 3D displays views
- Generate Psi and Delta with any sample structures
- Simulate experimental data and give fitting parameter values, 90% confidence and correlation matrix
- Own dispersion formula of Cauchy, EMA, Lorenz etc and a lot of material database
- Permit user to built one's own dispersion formula and database
- Advanced features for graphic manipulation screen
- Conveniently access to recipe steps and original files for processing
- Data and graph output function

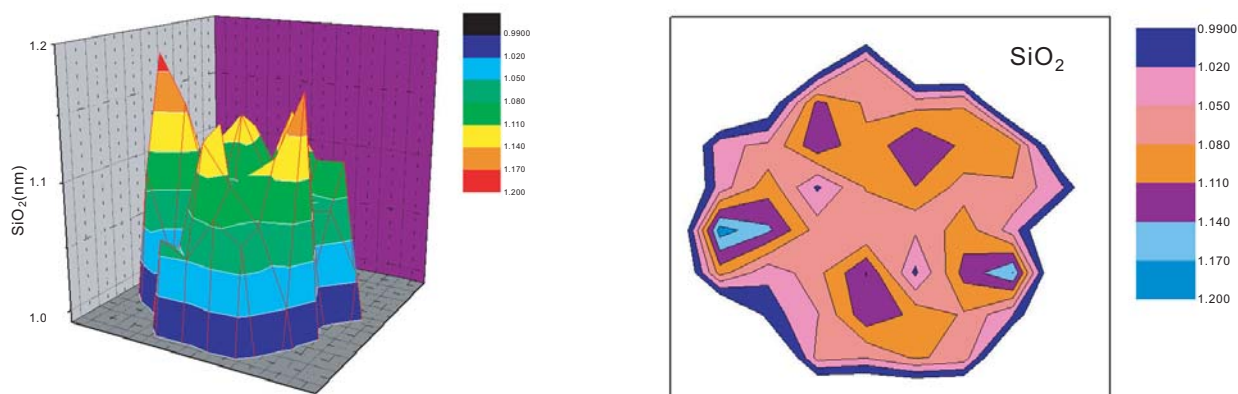
## Example: Refractive Index Dispersion

1	SiO2	102.6 nm
0	Si	1 mm





## Example: 3D mapping



## THIN FILM LIBRARY

*The PhE-VADE Research Ellipsometer software is prepared for a model and film library with predetermined measurement parameters allowing the operator to select an application and quickly execute a measurement. The film library with films stack of layers can easily be extended to include user defined film structures.*

## SPECIFICATIONS

Thickness range transparent films	0 - 6000 nm
Thickness range absorbing films	0 - 6000 nm
Range of angle of incidence	20 - 90 degrees
Reflection angle steps	5 degree +/- 0.01 deg.
Accuracy of measured Refractive index	0.001
Accuracy of film thickness	+/- 0.005 nm for 100 nm SiO <sub>2</sub> on silicon
Stability	Long term ( months ) +/- 0.01 deg in delta
Measurement time	1 second
Sample stage	Wafer chuck up to 200 mm diameter
Sample stage adjustments	Tilt and height
Sample alignment	Laser alignment, automatic tilt correction unit
Standard wavelength	632.8 nm
Optional wavelength	470 nm, 532 nm, 543 nm, 594 nm, 612 nm, 633 nm and 1150 nm or by request