Research India

Research India
M/Q-191, CWS Jayant, Singrauli (M P)
Tel.no-9425678895,9891048350
www.research-india.co.in
E-mail: sales@research-india.co.in

Multiple Angle Laser Ellipsometer REMPro

1. Introduction

Ellipsometer is a non-contact, non-destructive and high sensitive optical approach for characterization the structural and physical properties of thin film in the order of nanometer scale, which based on the light polarization change before and after reflection upon the sample surface and interface.

REMPro is a multiple angle laser ellipsometer, which is applied for measurement the film parameters on the smooth substrate. It provides the film thickness and optical constants at the He-Ne laser wavelength 632.8 nm with an extraordinary precision and accuracy. The REMPro can be utilized to characterize single films, multiple layer stacks (1~3 layer) and bulk materials (substrates).

Due to its modern, easy to use, recipe oriented and robust software, the REMPro fits the requirements of R&D as well as of quality control in production environments. It covers a large variety of applications like microelectronics, semiconductors, biology and life science, display technology and much more. High sensitivity over the entire ψ,Δ plane and ultra-low noise detection allow for measuring even non-ideal, stray light causing, rough surfaces as e.g. solar cells.

The REMPro is designed to tap the full potential of the method ellipsometry and to push the limits. The core concept of the REMPro with highly phase stabilized compensator, computer controlled frequency stabilized rotating compensator and two-zone averaging method allows for the measurement of ultra thin films and surface roughness on almost any kind of absorbing or transparent substrate with a flat, mirror - like surface.

The REMPro comprises a manual goniometer with superior performance and angle accuracy to perform fast variable angle measurements for more complex samples. The REMPro is a compact instrument, quickly up and running, it is controlled by state of the art PC.

2. Features

- Ideal measurement tools for film or coatings on substrate.
- Contactless, optical measurement of thin film thickness, refractive index, absorption and degree of polarization as an indicator of sample non-idealities.
- Extraordinary high stability and accuracy due to stable laser light source, advanced RCE sampling, two-zone averaging and ultra low noise detector.
- Highly precise sample alignment with optical auto collimating telescope and microscope.
- Modern, comfortable, streamlined and robust user interface includes a comprehensive package of predefined applications representing microelectronics, magnetic media, life science and more.
- Fast and comfortable measurement at a selectable, application specific single angle of incidence.
- Novel sample adjustment technology to improve effectively sample positioning precision.
- Unique noise treatment methods to enhance ratio of signal to noise (SNR) markedly.
- Enhanced optoelectronic detection technique to reduce the noise affect from production line significantly.

3. Technical Specifications

Item	Description
Wavelength:	632.8 nm (He-Ne laser)
Precision of film thickness [1)]:	0.01 nm for SiO_4 on Si
Precision of refractive index [1)]:	$5x10^{-4}$ for SiO_4 on Si
Measuring time:	(typical) 0.8 s
Total thickness range for transparent layers:	up to 6 µm
Number of layers:	default: 1-3 layers on a layer stack or substrate
Setup:	PSCA with Compensator
Angle of incidence:	manual goniometer (40° - 90°, set in steps of 5°)
Diameter of laser beam:	<1 mm
Sample stage:	sample stage for wafers up to 200 mm diameter Adjustable (z, tilt) samples stage ±6.5 mm
Sample alignment:	auto collimating telescope (ACT) for manual sample tilt and height adjustment
Maintenance:	automatic internal maintenance programs for checking the correct working of most parts of the

	ellipsometer
Computer:	state of the art PC with CD-ROM drive, mouse, keyboard, TFT flat screen monitor, Windows operation system
Software:	User friendly Windows based REMPro ellipsometer software: Predefined applications (recipes) allow for ease of use. Standard Measurement Modes *Single angle of incidence* (at any single angle between 40 and 85 degrees, 5 deg step) • ψ,Δ on any sample • optical constants of bulk material (substrate) n_s,k_s • single films, film thickness at a given refractive index n • single films, film thickness and refractive index n • double layer, two thicknesses, film thickness 1 and film thickness 2
Dimensions	887 x 332 x 552mm (at angle of incidence 90º)

Notes:

1) Precision is defined as standard deviation (1 sigma) of 30 measurements.

4. Performance guarantee

- High stability of laser light sources, high precision sampling method and low noise detection technology ensure that the system maintain high stability and high accuracy.
- High precision optical alignment system ensures fast, high precision direction adjustment of samples.
- Stable structure design and reliable sample azimuth alignment combining advanced sampling technology ensure the rapid and stable of measurement.
- Multiple-choice of discrete incidence angle can be applied to complex refractive index of samples and the absolute thickness measurement.