



Radial Symmetry Ellipsometer

Technology No. z00175

Radial Symmetry and Polarization Properties

A novel ellipsometer uses radial symmetry and exploits polarization properties of high numerical aperture lenses. For example, circularly polarized light may be focused to and reflected from a spot on a sample using an objective lens. A radially symmetric analyzer apparatus (e.g., a pure polarization rotator such as two half wave plates and a radially symmetric analyzer such as a birefringent lens) can attain a radially symmetric ellipsometric signal based on the reflected light and representative of at least one characteristic of the sample.

Ultra High Resolution from Smaller Scan Areas

Currently available techniques generally measure material properties over a large area, but determining the thickness and refractive index of homogeneous films over a larger areas is inadequate for exceedingly small featured structures. This aspect limits conventional ellipsometers to samples with large and uniform interface characteristics. This new method, however, can produce an ultra-high resolution image by scanning a relatively small spot. Measurement of homogeneous SiO₂ thin films on silicone as well as a photoresist microprism tested with spatial resolution of 0.5 μm with a He-Ne lasers source and an objective lens with a NA of 0.8.

BENEFITS AND FEATURES:

- Radial symmetry
- Polarization properties
- Ultra-high resolution images
- Works on relatively small spots

APPLICATIONS:

- Ellipsometry
- Both large and small scan areas

Phase of Development - Proof of Concept

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