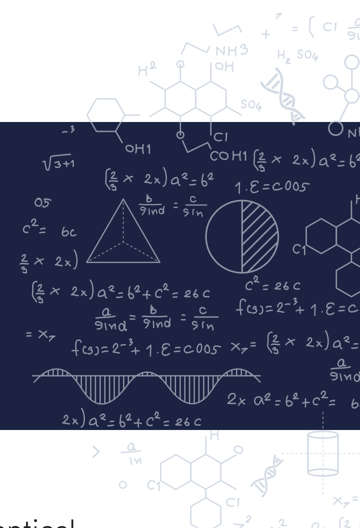


LICENSING OPPORTUNITY: MUELLER MATRIX ELLIPSOMETER

DESCRIPTION

Problem

In the past, ellipsometers have been constructed for operation in the terahertz, infrared, visible, and ultraviolet spectral regions, with a minimum wavelength of about 140 nm. Extending such a device into the VUV and EUV regions of the electromagnetic spectrum has been impeded by the fact that nearly all materials are opaque in these regions. Therefore, these devices need to rely upon reflection from surfaces instead of transmission through materials.

Invention

A multi-mirror polarization state generator is combined with a multi-mirror polarization state analyzer and a detector to realize a Mueller matrix ellipsometer. It is found that grazing incidence reflection from a number of materials provides sufficient optical phase retardance to make this possible.

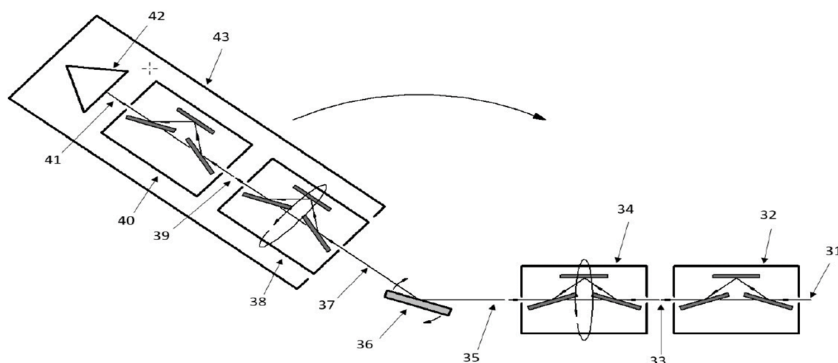
BENEFITS

Potential Commercial Applications

Having this technology available would assist US chip manufacturers and US semiconductor tool manufacturers in characterizing materials and nanostructures. Optical critical dimension metrology or scatterometry would benefit from being able to operate at shorter wavelengths to achieve higher accuracy and precision.

Competitive Advantage

Spectroscopic ellipsometry meets a barrier for wavelengths shorter than about 150 nm. The technology described in this invention disclosure should allow this technique to be extended to at least 50 nm.



One embodiment of the invention.

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