

# Refractive Index Measurement of Waveguides and Fibers BY IMAGING ELLIPSOMETRY

## SAMPLE AND SETUP

Spectral dispersion of refractive index needs to be measured on microscopic core region in waveguides and optical fibers. The difference of refractive index between core and clad region may be as small as 0.001 at very low doping concentrations.

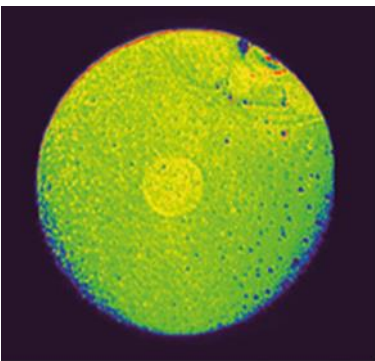
Imaging ellipsometry with the **nanofilm\_ep4** offers highest lateral ellipsometric resolution down to 1  $\mu\text{m}$ . It combines the sensitivity for thickness and spectral refractive index measurements of ellipsometry with the benefits of magnification and lateral resolution of optical microscopy.



nanofilm\_ep4

## MEASUREMENT

### First identify, then measure:



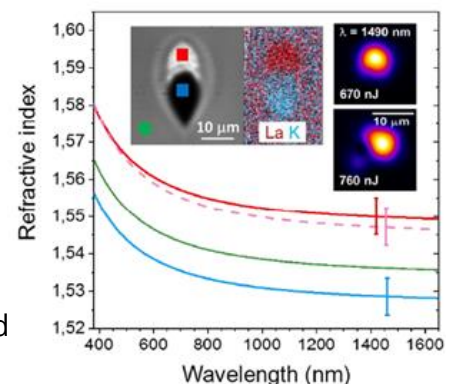
As2S3 (fiber, core/clad)

Angle of incidence, wavelength and polarizing angles are set to enhance the ellipsometric contrast in live view. This ECM mode (Ellipsometric Contrast enhanced Microscopy) enables a fast and easy identification of the core region, even with smallest doping concentrations.

During the next step, two regions on core and clad are defined to run a spectroscopic measurement in a desired wavelength range between 190nm and 2700nm. All pixel within each region are averaged.

## RESULTS

- Core region easily identified
- ECM mode helps to identify contaminations and to exclude them from measurements
- Dispersive refractive index of core and clad region measured



## APPLICATIONS

- Refractive index of waveguides and fibers (190nm - 2700nm)
- Thin layers on vertical waveguide facets
- Integrated photonics