POD013

Characterization of Surface Topometry and Determination of Layer Thickness by Scanning White Light Interference Microscopy

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3D coherence scanning interferometry (CSI) is an optical, non-contact and rapide measurement technique using a defined bandwidth of white light at normal incidence. Based on this operational principle, white light interference microscopy (WLIM) provides three-dimensional surface topometry data up to a resolution of 0.4 µm lateral and 0.1 nm vertical. Three operating modi, i.e. surface, films and advanced films, enable measurements of step heights, roughness, wear volume, cone angle, surface pattern and layer thickness of transparent coatings.
The determination of layer thickness by WLIM requires the knowledge of optical constants, i.e.the refractive index n and the extinction coefficient k. For technical surfaces, data base values - if available at all - have to be determined or validated by spectroscopic ellipsometry (SE). From this oblique incidence technique both optical constants and layer thickness can be derived based on a model for at least semi-transparent coatings. For different layer thicknesses, a comparison is made between WLIM and SE. Measurement uncertainty is discussed for both topometric features and layer thickness for different use cases.
Traceability to SI system is ensured by certified standards (PTB/NIST) within a DAkkS DIN EN ISO/IEC 17025:2018 accredited lab.

Keywords
roughness and step heights
lateral surface pattern
layer thickness of transparent coatings
scanning white light interferometry
spectroscopic ellipsometry