Structure and anisotropy of thin films by IR-ellipsometry and IR-nanopolarimetry

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Anisotropy and structure are essential for physical, chemical and functional properties of materials in optoelectronic, polymer, plasmonic and bio-related research. Ellipsometry and other polarization dependent optical methods are the methods of choice for destruction-free structural analysis of thin films in various environments [1,2] from macroscopic to nanoscopic length scales [2–4]. In particular infrared (IR) spectroscopic methods can investigate thickness, material and structural properties with high spectral contrast at high sensitivity. Laser laboratory sources such as pulsed optical parametric oscillators (OPO) and pulsed laser sources, as well as tunable free-electron lasers (FEL) and synchrotron radiation sources were important to push the development of modern IR spectroscopic ellipsometry and nanoscopic methods. Recently the availability of tunable quantum cascade lasers (QCL) significantly broadened the number of applications of IR ellipsometric and IR nanoscopic applications. In this talk I will review about activities of our group in this field as well as IR ellipsometric and AFM-IR studies of structured surfaces, anisotropic molecular aggregates and epsilon near zero modes in silicon oxide films. [3–5]

References

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