ELLIPSOMETRIC INFRARED MICROSCOPY

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Optical constants and properties of anisotropic thin films such as electronic conductivity or molecular orientations are of high technological interest for design of efficient optical, electronic, and sensing devices. Standard Fourier Transform Infrared (FTIR) microscopy is upgraded for mapping of polarization dependent optical properties of thin oxide and polymer films. The extension for ellipsometric microscopy is outlined. IR microscopic optical properties of thin silicon oxide and indium tin oxide (ITO) films are measured and quantitatively characterized by optical calculations with respect to anisotropy, conductivity and thickness. P-polarized reflection spectra are used for characterization of Berreman modes, plasmon polaritons as well as the average molecular orientation of phenylenediamine (PDA) rings in an uniaxial polyimide film. This new measurement possibility is in general interesting for study and mapping of anisotropic properties of thin films of plasmonic, oxide, hybrid and metamaterials with high lateral resolution.

Keywords: Infrared Ellipsometry, Microscopy, Anisotropy, Thin films

References