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## Original Paper

Ellipsometry from infrared to vacuum ultraviolet: Structural properties of thin anisotropic guanine films on silicon

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## Abstract

Bio-molecular films of the DNA base guanine were characterized by ellipsometry from the Infrared (IR) to Vacuum Ultraviolet (VUV) spectral range, X-ray diffraction (XRD) and atomic force microscopy (AFM). In this study we in particular focus on the contact-less and reference-free characterization of thin anisotropic bio-molecular films by ellipsometry. Ellipsometric spectra in the IR as well as in the UV-VUV spectral range are molecule specific and the absorption bands could be used to identify molecules deposited on a substrate, since both the vibrational and electronic excitations are molecule specific. Especially we demonstrate that the measured pseudo-dielectric function in the mid infrared (MIR) spectral range can be used as a characteristic “fingerprint” for DNA base molecules and their orientation in a thin film. Moreover an interpretation of the ellipsometric spectra in an optical model delivers the dielectric function and could give information about the molecular structure, orientation and conductivity. The determination of average molecular orientations from IR and UV/VUV ellipsometry spectra is discussed. (© 2005 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim)

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