

Determination of the anisotropic dielectric function for metal free phthalocyanine thin films

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Abstract

Thin films of metal free phthalocyanine (H_2Pc) were grown by organic molecular beam deposition (OMBD) in high vacuum (HV) simultaneously on different substrates. The substrates (hydrogen passivated Si(111) and NaCl) were kept at room temperature during the deposition. From the absorption spectra in the visible and ultraviolet region the films are found to consist predominantly of the α crystalline phase. All the films are uniaxial and strongly optically anisotropic. The dielectric function for H_2Pc films was obtained in the spectral range of 0.7–4.5 eV from the simulation of ellipsometry spectra. The orientation of the molecules with respect to the substrate is derived from the difference between the in-plane and out-of-plane components of the dielectric function and the results of infrared (IR) measurements.

Author Keywords: Ellipsometry; Infrared spectroscopy; Optical anisotropy; Organic molecular thin films