REVERSE BACKSIDE REFLECTION ELLIPSOMETRY FOR ACCURATE OPTICAL PROPERTY DETERMINATION IN OLED SUBSTRATES

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Materials used in OLED systems, both substrates and thin films, dielectrics and semiconductors, exhibit significant absorption in the UV region. This high absorption reduces the intensity of reflected light, complicating the evaluation of refractive index and absorption coefficient dispersion curves of the materials. This issue is particularly pronounced with glass substrates and very thin adhesive layers used between the glass substrate and indium tin oxide (ITO) thin films, for example. In this work, we demonstrate the importance of measuring reverse backside reflection (BSR) for analyzing OLEDs from the glass substrate side (Fig. 1). Spectroscopic ellipsometry data provides detailed insights into BSR and reverse BSR including depolarization effects, enabling precise determination of the optical properties of the glass substrate, thin SiO_2 layers, and ITO This precision is crucial for accurate investigations of the organic compounds in OLEDs for both *ex-situ* and *in-situ* studies. The approach of BSR measurements can be applied to any transparent substrates with thin films.

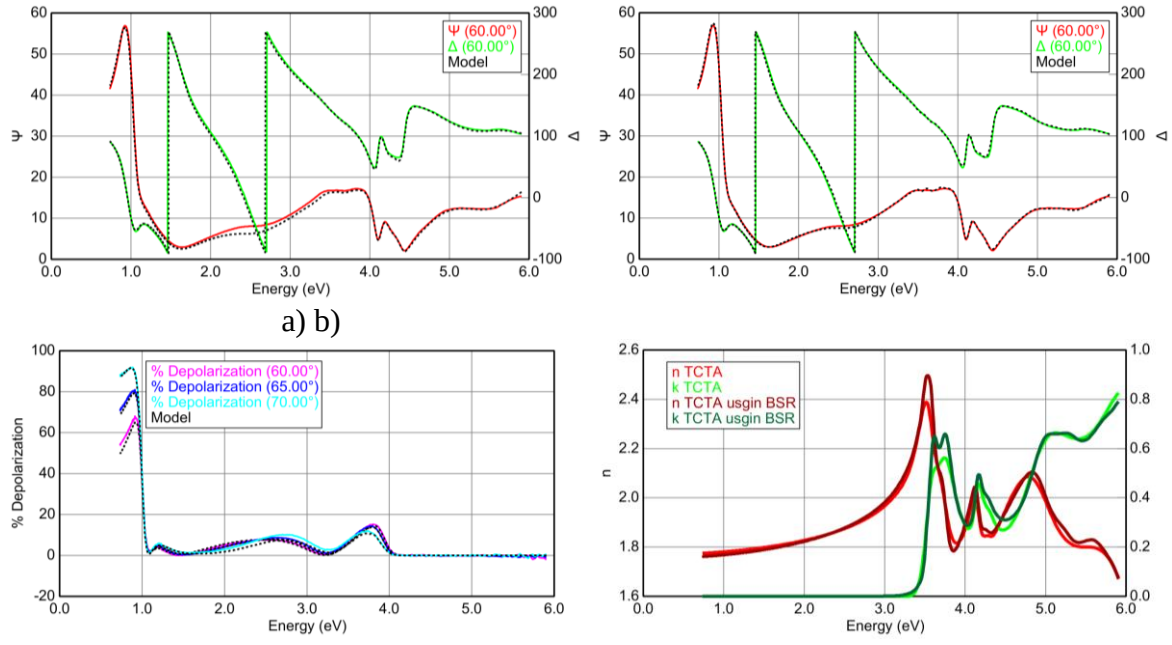

Fig.1 Main ellipsometric angles Ψ and Δ as a function of photon energy at incident angle of 60° for (a) glass/ITO (108 nm)/TCTA (47 nm), and (b) glass/SiO2 (40 nm)/ITO (105 nm)/TCTA (50 nm), structure. The dotted liens represent model fit (MSE are 18.5 and 7.9 respectively). The depolarization (c) as a function of photon energy at three incident angles for the sample measured with BSR. Refractive index and extinction coefficient (d) as a function of photon energy in two cases when optical properties of the substrate are evaluated with low (red and green curves) and high precision (dark red and dark green curves).