

Angular resolved spectroscopic ellipsometric measurements of nano-composite and nano-porous thin films

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Thin films with controlled dimension self-assembled nanosized clusters or voids embedded in the host matrix attract much attention due to vast range of practical applications in optics, electronics, life science and other areas. We address two types of such materials, namely, nano-composite thin films based on diamond like carbon (DLC) host matrix containing metal nanoparticles [1] and dense arrays of nanometer holes in thin metal films produced using anodized aluminium oxide (AAO) nano-porous membranes [2].

Variable angle spectroscopic ellipsometry technique is employed for non-destructive investigation of DLC:Cu (see Fig. 1), DLC:Ag and AAO nano-composite thin films. The thickness of films and their optical properties, such as dispersion relationships of refractive index and extinction coefficient, were measured by fitting modelled values with the experimental ellipsometric parameters. We demonstrate how layer synthesis parameters can be used to optimize certain properties, e.g. tune the scattering resonance or minimize the surface reflection background.

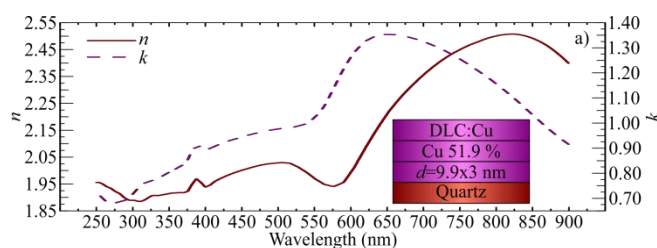


Fig. 1 Dispersion relations of refraction index n and extinction coefficient k of DLC:Cu nano-composite thin films. Insets show the optical models of samples

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