

Spectroscopic Ellipsometry of Au Nanoparticles Layers

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Abstract. The contribution concerns the possibility of using known gold permittivity values in the optical region for applications with gold nanoparticles with a size of approximately 7 nm. Two database sources (Johnson and Christy, Palik) are compared in simulating the effective permittivity of gold nanoparticle layers and interpreting previous ellipsometry measurements. The material parameters of thin homogeneous layers of gold can, under certain conditions, be used for the mathematical description of localized plasmons in real layers of nanoparticles. The proposed method is based on a quasi-static approximation in combination with a red-shift following from Clausius-Mossotti relation, which partially also includes mutual screening of nanoparticle dipole fields.