A method for the determination of the optical constants (n and k) of thin films with large optical inhomogeneities

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The existing methods for determining the optical constants of inhomogeneous thin films deal with non-absorbing films or at the most with films that have very small absorption ($k < 0.02$). In this work, a method is presented for the determination of the optical constants of inhomogeneous thin films with large optical inhomogeneities. The optical constants are derived from normal-incidence measurements of reflectance and transmittance. The refractive index was modelled by quadratic variation. However, the absorption index was replaced by its mean value. The accuracy of this assumption was tested and its range of validity was determined. Subsequently, the method was applied to the determination of the optical constants of cerium oxide thin films.