ESTIMATION OF THE CHARACTERIZATION ACCURACY OF A THIN NONABSORBING FILM BY MULTIPLE-ANGLE-OF-INCIDENCE ELLIPSOMETRY

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S u m m a r y

While determining the parameters of thin nonabsorbing films experimentally, making use of the method of multiple-angle-of-incidence ellipsometry (MAIE), a drastic decrease of the characterization accuracy has been found for some specimens. In order to study this effect, we introduced the error function of a new type that has a clear physical meaning of the "averaged neglected photocurrent" and, on its basis, built a procedure for the numerical solution of the inverse problem of ellipsometry. The treatment of experimental data making use of this procedure enabled the boundaries of the region of admissible parameters (RAP) to be determined for a number of porous TiO_2 film specimens. Furthermore, the numerical calculations showed that the accuracy of the ellipsometric film characterization depends on the film parameters in an oscillatory manner. The results obtained have demonstrated that the stage of numerical calculations of the RAP boundaries has to be included into the procedure of solving the inverse problem of ellipsometry.