

COMPARISON BETWEEN THE EFFICIENCIES  
OF SURFACE PLASMON POLARITON  
EXCITATION BY THE METHODS  
OF RELIEF – PHASE DIFFRACTION  
GRATING AND ATTENUATED  
TOTAL REFLECTION PRISM

*N.L. Dmitruk, A.V. Korovin, S.V. Mamykin,  
M.V. Sosnova, E.F. Venger*

V.E. Lashkarev Institute of Semiconductor Physics,  
Nat. Acad. of Sci. of Ukraine  
(41, Nauky Ave., Kyiv 03028, Ukraine;  
e-mail: dmitruk@isp.kiev.ua)

S u m m a r y

The paper is devoted to the consecutive comparison of advantages and disadvantages of widely used methods of surface plasmon polariton excitation, namely attenuated total reflection and diffraction grating. The surface plasmon polariton efficiency and the influence of separated elements of the system on its sensitivity have been analyzed. The analytical expressions for the sensory system sensitivity with additional selective-sensitivity layer insertion are obtained for both types of sensor systems. It is established that the sensitivity of both types of sensor systems in a wide range of variation of the testing medium refractive index are different at different ranges of the refractive index. For a diffraction grating, the sensitivity maximum is achieved for low refractive indices, while, in the case of attenuated total reflection, the sensitivity is higher at a higher refractive index.