CONTROL OF REFLECTANCE SPECTRUM OF BeO CERAMICS SURFACE

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Beryllium oxyde (BeO) and ceramics based on it are prospective materials for manufacturing of optical elements for the middle infrared laser systems. However, the polycrystalline structure of the ceramics and the roughness of its surface lead to a decrease in reflectance and an increase of reflected energy losses caused by excitation of surface polaritons (SP) on the BeO ceramics surface. There are several ways to prevent this channel of dissipation of incident radiation. One of them is a deposition of thin dielectric film with high refraction index n (e.g. the germanium Ge film with n = 4) upon the reflecting ceramics surface. The existence of such a film leads to the low frequency shift of the upper edge of the SP gap. As a result, no polariton absorption bands in the CO_2 laser generation range (10.6 μ) are observed in the IR reflection spectra of the "film-Ge-BeO" sandwich. In the present paper the IR reflection and attenuated total reflection spectra of the Ge-BeO system were investigated for variable Ge film thickness (0.2, 0.53, and 2.5 μ). The dispersion relations for the H-polarized WGP in the "air-Ge-BeO" system were calculated for various Ge film thickness disregard the optical phonon damping.