SECONDARY EMISSION FROM SYNTHETIC OPAL INFILTRATED BY COLLOIDAL GOLD AND GLYCINE

G.I. Dovbeshko[1], *O.M. Fesenko*[1], *V.V. Boyko*[1], *V.R. Romanyuk*[2], *V.S. Gorelik*[3], *V.N. Moiseyenko*[4], *V.B. Sobolev*[5], *V.V. Shvalagin*[6]

[1]Institute of Physics, Nat. Acad. of Sci. of Ukraine (*46, Nauky Av., Kyiv 03028, Ukraine*),
[2]V.E. Lashkaryov Institute of Semiconductor Physics, Nat. Acad. of Sci. of Ukraine (*41, Nauky Av., Kyiv 03680, Ukraine*),
[3]P.N. Lebedev Physical Institute, Russian Acad. of Sci. (*53, Leninsky Prospect, Moscow 119991, Russia*),
[4]Dnipropetrovsk National University (*72, Prosp. Gagarina, Dnipropetrovsk 49050, Ukraine*),
[5]Technical Center of Nat. Acad. of Sci. of Ukraine (*13, Pokrovskaya Str., Kyiv 04070, Ukraine*),
[6]L.V. Pysarzhevsky Institute of Physical Chemistry, Nat. Acad. of Sci. of Ukraine (*31, Nauky Av., Kyiv 03028, Ukraine*)

S u m m a r y

A comparison of the secondary emission (photoluminescence) and Bragg reflection spectra of photonic crystals (PC), namely, synthetic opals, opals infiltrated by colloidal gold, glycine, and a complex of colloidal gold with glycine is performed. The infiltration of colloidal gold and a complex of colloidal gold with glycine into the pores of PC causes a short-wavelength shift (about 5–15 nm) of the Bragg reflection and increases the intensity of this band by 1.5–3 times. In photoluminescence, the infiltration of PC by colloidal gold and colloidal gold with glycine suppresses the PC emission band near 375–450 nm and enhances the shoulder of the stop-zone band of PC in the region of 470–510 nm. The shape of the observed PC emission band connected with defects in synthetic opal is determined by the type of infiltrates and the excitation wavelength. Possible mechanisms of the effects are discussed.