

INTERPRETATION OF EXCITON
PHOTOLUMINESCENCE SPECTRA
IN FILMS WITH SILICON QUANTUM DOTS

*A.V. Sachenko, I.O. Sokolovsky, E.B. Kaganovich,
E.G. Manoilov*

V.E. Lashkarev Institute of Semiconductor Physics,
Nat. Acad. Sci. of Ukraine
(41, Nauky Prosp., Kyiv 03028, Ukraine;
e-mail: dept_5@isp.kiev.ua)

S u m m a r y

The photoluminescence (PL) spectra in films with silicon quantum dots (Si QDs) — the Si nanocrystal (Si NC)/SiO_x-matrix ($x \rightarrow 2$) system — have been considered in the framework of the excitonic photoluminescence model. The calculations made allowance for the discreteness of emitting Si NCs by size, which was determined by the minima in the oscillatory dependence of the exciton radiative lifetime on the Si NC dimensions, and the quantum-mechanical mesoscopic broadening of PL bands. A satisfactory agreement between measured and calculated PL spectra has been obtained.