INFLUENCE OF HIGH TEMPERATURE ANNEALING ON THE STRUCTURE AND THE INTRINSIC ABSORPTION EDGE OF THIN-FILM SILICON DOPED WITH TIN

R.M. Rudenko[1], *V.V. Voitovych*[2],
M.M. Kras'ko[2], *A.G. Kolosyuk*[2], *A.M. Kraichynskyi*[2],
V.O. Yukhymchuk[3], *V.A. Makara*[1]

[1]Taras Shevchenko National University of Kyiv,
Faculty of Physics
(*2, Academician Glushkov Ave., Kyiv 03680, Ukraine;*
e-mail: rudenko.romann@gmail.com),
[2]Institute of Physics, Nat. Acad. of Sci. of Ukraine
(*46, Nauky Ave., Kyiv 03680, Ukraine*),
[3]V.E. Lashkaryov Institute of Semiconductor Physics,
Nat. Acad. of Sci. of Ukraine
(*45, Nauky Ave., Kyiv 03028, Ukraine*)

S u m m a r y

Influence of isochronal annealing in the range of 350–1100 °C on the structural properties and the intrinsic absorption edge in thin silicon films doped with tin (*a*-SiSn) has been studied. It is found that as-deposited *a*-SiSn films with a tin content of about 4 at.%, unlike undoped *a*-Si ones, contain silicon nanocrystals with a crystallite size of about 4 nm and a crystalline fraction of about 65%. It is shown that, in the course of isochronal annealing of *a*-SiSn specimens in the interval of 350–1100 °C, the size of silicon nanocrystals in the amorphous matrix gradually increases to about 7 nm, and the fraction of crystalline phase to about 100%. Crystallization in undoped *a*-Si is observed only after the annealing at temperatures above 700 °C. The influence of tin on the optical band gap in *a*-Si as a function of the isochronal annealing temperature is analyzed.