

THE POSSIBILITY OF OBSERVATION
OF POSITRONIC STATES AND PHASE
TRANSITIONS AT THE POROUS
SILICON SURFACE

*V. I. Grafutin, E. P. Prokop'ev, S. P. Timoshenkov¹,
S. A. Gavrilov¹, G. G. Myasisheva, Yu. V. Funtikov*

State Science and Research Center
of the Russian Federation,
Institute for Theoretical and Experimental Physics
(Russia 117259, Moscow,
Bol'shaya Cheremushkinskaya Str., 25),

¹The Moscow Institute of Electronic Technology
(Russia 103498, Moscow, Zelenograd)

S u m m a r y

The kinetic scheme of transitions and annihilation decays of positronic and positronium states in the volume of a crystal, crystalline skeleton, on a surface, and in the volume of pores of a porous silicon is presented. The formulas linking the intensities of the time components of annihilation decay $\tau_i^j (I_i^j)$ with the velocities of decays and transitions of positronic and positronium states in the volume of pores are obtained. The estimation of the interaction constant k_x with the surface of pores accompanied by the formation of the surface state of a positronium atom gives $k_x \approx 10^7 - 10^8 \text{ s}^{-1}$ and the average value of a pore radius $\approx 2 \text{ nm}$. The possible explanation of surface phase transitions in porous silicon, observed with the help of positron annihilation spectroscopy, is given.