The Photoelectric Characteristics of Thermally Oxidized Macro Porous Silicon Structures on the Intensity of Incident Light.

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We investigated the samples of thermally oxidized macroporous silicon structures characterized by the [100] orientation, the thickness H=500 μm, the n-type of conductivity, the specific resistance of 4.5 Ω×cm. The macropores had the diameter D_p=1-6 μm, the depth h_p=40-100 μm, the distance between the pores of a-D_p=1-4 μm. The silicon oxide layer is equal to 15 nm.

If the concentration of electrons at the surface states increased (see figure, its reciprocal quantity decreases) then decreases the concentration of electrons in the conduction band and the photoconductivity of macroporous silicon structure.

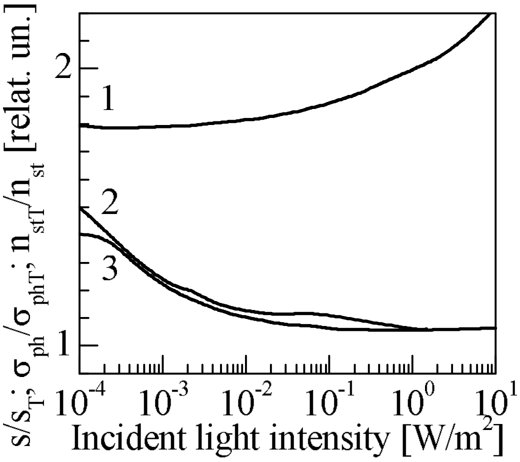

Fig. The calculated dependencies of the thermally oxidized of sample relative of the initial sample: the surface recombination velocity 1, the photoconductivity 2, the reciprocal of the density of filled acceptor surface states 3 on the intensity of incident light (λ = 0.95 micron).

We see from the figure that the photoconductivity of macroporous silicon structures depends inversely proportional on the density of filled acceptor surface states because the curves 2 and curves 3 almost coincide. The increases in surface recombination velocity can also result in decrease in photoconductivity.

It was found that an increase in the photoconductivity of thermally oxidized samples of macroporous silicon structures relative to the initial samples, with an increase in the intensity of the incident light, is connected with the decrease in the number of electrons on the surface levels on the surface of macropores.

1. Onyshchenko V.F., Karachevtseva L.A. Conductivity and photoconductivity of two-dimensional macroporous silicon structures // *Ukr. J. Phys.* – 2013. – Vol.**58**, №9. – P. 846–852.