

THE INFLUENCE OF ADSORPTION OF ALCOHOL
AND WATER VAPORS ON CURRENTS OF A MIS
STRUCTURE WITH AN INTERMEDIATE
LAYER OF POROUS SILICON

*V.A. Skryshevsky, I.V. Gavrilenko, G.V. Kuznetsov,
S.A. Dyachenko*

Taras Shevchenko Kyiv National University,
Faculty of Radiophysics
(64, Volodymyrs'ka Str., Kyiv 01033, Ukraine)

S u m m a r y

The influence of the adsorption of water and alcohol vapors on the $V-I$ characteristics of “metal-porous silicon-silicon” structures is analyzed theoretically and investigated experimentally. The analysis of the diffusion-drift equations allows us to derive expressions that show in what way the current depends on the variation of the dielectric constant and the built-in charge in porous silicon (PS). The highest current is reached for the 40% concentration of alcohol in water, which is explained by the competition between the injection of electrons into PS in the process of nondissociative adsorption of water molecules and the passivating properties of the adsorbed layer of alcohol molecules. We propose a model of recombination that explains the nonmonotonous character of the current variation in the process of adsorption of the mixture of water and alcohol.