

RESEARCH OF PROCESSES OF ELECTRON-BEAM DEPOSITION OF BORON-CONTAINING COATINGS IN FORE-VACUUM PRESSURE RANGE *

A.V. TYUNKOV¹, YU.G. YUSHKOV^{1,2}, D.B. ZOLOTUKHIN^{1,2}

¹*Tomsk State University of Control Systems and Radioelectronics, Tomsk, Russia*

²*Institute of High Current Electronics, Tomsk, Russia*

Boron plasma is widely used in the generation of accelerated ion beams for the technology of boron implantation into semiconductor wafers for the creation of element base of microelectronics and dielectric protective coatings [1-2]. The novelty of the ongoing research is based on the use of unique equipment and original approaches based on electron-beam evaporation of a solid target made of pure boron with low electrical conductivity [3]. It is the low conductivity of pure boron under normal conditions that prevents the use of a target made of this material for focusing an electron beam to heat it. The originality of the approach for the generation of boron plasma in relation to the creation of coatings, in this case, lies in the use of a fore-vacuum electron source operating at an elevated gas pressure of 10 Pa, at which the surface charge of the electron beam on the target is neutralized by ions from dense beam plasma. This provides the possibility of heating, evaporation and ionization of the solid-state target material made of pure boron.

This work presents the results of studying the characteristics of electron-beam evaporation of boron and the parameters of the beam plasma of boron, including the mass-charge composition of ions, the spatial distributions of vapors of the evaporated target, the deposition rates and the main characteristics of the coatings.

REFERENCES

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* The work was supported by grant of the Russian Science Foundation (project № 22-29-00381).