

INFLUENCE OF DEPOSITION TECHNOLOGICAL PARAMETERS COATINGS OF THE YA1O SYSTEM BY THE METHOD OF VACUUM-ARC ON THE STRUCTURE AND PHASE COMPOSITION OF THE COATING.*

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The paper deals with the development of simulation methods as applied to low-pressure discharges with extremely high reduced electric fields E/p for which it is problematic to correctly describe the ionization processes in classical electron avalanches. In some conditions, the electron free path for ionization can compare with the interelectrode gap width such that the notion of electron avalanches becomes inapplicable at all. Typical examples are discharges in so-called pseudo-spark switches and in electron and ion plasma sources [1].

Increase the temperature of the gases in front of the GTE turbine is necessary to improve the power and efficiency of gas turbine engines (GTE). In this regard, it is necessary to protect GTE parts from exposure to high temperatures and gas flow. Thermal barrier coatings based on ZrO_2 - Y_2O_3 are used to protect the temperature drop of the blades [1, 2, 3, 4].

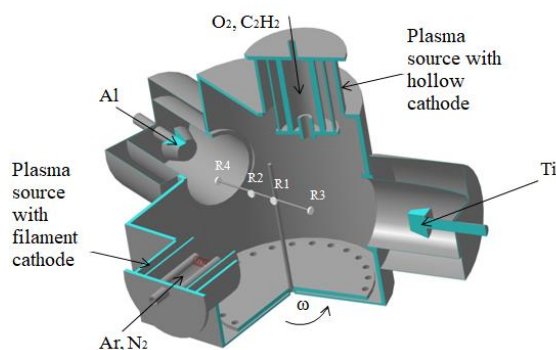


Fig. 1. Experimental installation NNV-6,6 II.

Currently, a widely used material for thermal barrier coatings (TBCs) was zirconium dioxide, partially stabilized with yttrium, i.e. ≈ 8 wt. % Y_2O_3 (8YSZ) [6, 7, 8]. But recent works presented that yttrium aluminates are promising materials for TBC due to their excellent stability at high temperatures, as well as mechanical and thermal properties [5,6]. At high temperatures, yttrium aluminum garnet (i.e., $Y_3Al_5O_{12}$, YAG) is stable as Al_2O_3 [5], which used for Ni-based superalloys as a thermally grown oxide layer. Besides YAG, $Y_4Al_2O_9$ (YAM) is also a stable compound in the YA1O system.

In this paper describe the effect of technological parameters of coating the YA1O system on phase and chemical composition. Regularities of the influence of the concentration of yttrium and aluminum on the phase composition of the coating are obtained. Heat-resistance of developed coating was studied.

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