

MEASUREMENTS OF VACUUM ARC THRESHOLD CURRENT FOR W FUZZ*

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The interaction of plasma with the surface is a key factor for the realization of magnetic confinement fusion. Experiments on the interaction of plasma and tungsten walls were carried out on linear accelerators and tokamaks. As a result of the interaction of helium plasma with the walls, nanostructures are formed, called "fuzz" [1,2].

This work is devoted to the study of the vacuum arc for a tungsten cathode with a nanostructured surface. Tungsten cathodes were thin metal plates with sides of 16 x 13 mm. Several cathodes were used with different exposure times to helium plasma (1-8 hours). The trigger method for ignition of a vacuum arc was used. For this purpose, a trigger electrode was placed between the anode and cathode. High voltage pulse (500 ns; 15 - 25 kV; ~ 3.5 A) was applied to trigger electrode to start vacuum arc. The anode was a tungsten wire placed parallel to the cathode surface. In this experiment, the vacuum arc was powered by anode RC circuit charged to 200 V. The arcing current was measured by a low inductive shunt.

As a result, the distribution of the threshold currents was obtained. The threshold current value is much lower than for ordinary tungsten.

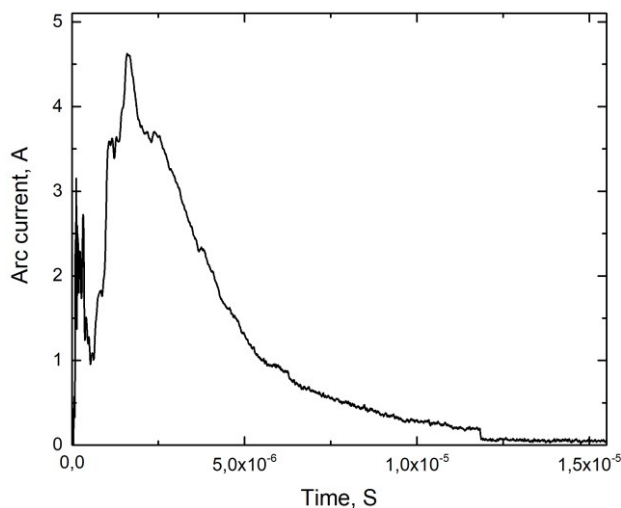


Fig.1. Typical waveform of arc current.

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