Abstract Submitted
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Erosion of thermionic cathodes VALERIAN NEMCHINSKY, None — Two types of the thermionic cathodes are used in industry: a) Tungsten (doped with thoria or pure) cathodes burning in a unreactive gas, and b) Thermo-chemical cathodes, such as a Hafnium cathode burning in oxygen plasma gas (mostly used plasma cutting). Both types of the cathodes experience cycle (arc on/off) erosion and constant current erosion. Available experimental data for both types of cathodes and both types of erosions (constant current and cycling) are presented and discussed. Based on the model [1,2] the constant current erosion rate is calculated. Comparison of the results of the calculations with the experimental data show reasonable agreement. Existing hypotheses on cycling erosion are also discussed. For the Tungsten cathode, it is suggested that the start erosion is mainly due to the cold cathode mode (vacuum arc mode) of the arc operation that takes place just after the arc ignition. The presented estimation doesn't contradict this hypothesis. For the Hafnium cathode, the model of the "open can" erosion [3] is supported by recently published observations.

[1] V.A. Nemchinsky J. Phys.D, 45, 135201
[2] V.A.Nemchinsky Plasma Chem.Plasma Proces. 33, 517
[3] V.A.Nemchinsky J.Phys.D. 36, 1573.

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