Abstract Submitted
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Investigation of the arc attachment at thoriated cathodes in a model lamp by measurement and simulation[1] A. BERGNER, M. WESTERMEIER, C. RUHRMANN, J. MENTEL, P. AWAKOWICZ, Institute for Plasma Technology, Ruhr University Bochum, Germany — This paper deals with pyrometric temperature measurements at thoriated cathodes in a model lamp and the emitter effect of thorium which is induced by a thorium atom monolayer at the cathode end face. For that purpose the cathode is operated in the diffuse mode with direct current and the temperature is recorded by absolutely calibrated two-dimensional 1-wavelength pyrometry. Furthermore corresponding numerical simulations of the cathode temperature in dependence on the work function done by a commercial finite element solver are presented. They are compared with the experimental results to get a quantitative impression of the reduction of the work function and cathode temperature by the thorium monolayer. A physical explanation of the deposition of the monolayer is given by comparing anodic and cathodic current transfer. Thus it can be found that the work function of tungsten is reduced by 1.5 eV by the emitter effect of thorium.

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