Abstract Submitted
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Barium transport in fluorescent lamps[1] F. SIGENEGER, K. RACKOW, D. UHRLANDT, J. EHLBECK, INP Greifswald, Germany, G. LIEDER, RLS-M, OSRAM GmbH, Munich, Germany — The transport of barium atoms and ions in the cathode region of fluorescent lamps driven at 25 kHz is studied experimentally and theoretically. The density of Ba atoms and ions have been measured time-resolved by laserinduced fluorescence at different distances from the spot center. Furthermore, the time-dependent cathode fall voltage was approximately determined using an improved band method. The model comprises the solution of the time-dependent particle balance equations of Ba and Ba^+ which include the Ba ionization as gain and loss terms, respectively. The ionization rate coefficient of Ba and the electron density are determined by solving the space-dependent electron Boltzmann equation in spherical geometry using the measured cathode fall voltage and the discharge current as input. Good agreement between the measured and calculated density profiles of barium atoms has been obtained. The results demonstrate the sensitive dependence of the Ba density profiles on the ionization which leads to a strong depletion of the Ba density in the cathode phase of the investigated electrode. The model yields the Ba flux from the cathode which limits the lifetime of the lamp.

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