Abstract Submitted for the GEC07 Meeting of The American Physical Society

Effect of H_2 and N_2 Impurities in Argon on the Kinetics of Electrons NUNO PINHAO, Nuclear and Technological Institute, Physics Dept., Sacavem, Portugal, MARIO PINHEIRO, Lisbon Technical University, Physics Dept., Lisbon, Portugal, ZOLTAN DONKO, Research Institute for Solid State Physics and Optics, Budapest, Hungary — The presence of small amounts of gas impurities in argon glow discharges used for optical emission spectrometry (GDOES) has strong implications on the accurate calibration of GDOES. To circumvent these difficulties, the intentional admixture of controlled amounts of H_2 or N_2 to argon has been practiced [1]. The understanding of the electron kinetics in these mixtures is valuable for the characterization and calibration of the cell. In this work the electron velocity distribution function, rate coefficients and transport parameters are computed in Ar + xH₂ and Ar + xN₂ mixtures, with $0\% \le x \le 10\%$, for pulsed Townsend discharge conditions. Different computational techniques are used: a classical two-term expansion, a modified finite elements method applied to the density gradients representation, and a Monte Carlo simulation at the same discharge conditions. Two different set of cross sections for H_2 are used [2,3], allowing a comparison between them.

[1] Hodoroaba et al. J. Anal. At. Spectrom. 18, 521 (2003)

[2] [http://jilawww.colorado.edu/~avp]

[3] Loureiro et al. J. Phys. D: Appl. Phys. 22 1680 (1989)

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Date submitted: 14 Jun 2007

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