

Abstract Submitted
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Homogeneous DBD in N₂: I. LIF, TALIF and electrical measurements NICOLAS GHERARDI, ET-TOUHAMI ES-SEBBAR, CHRISTIAN SARRA-BOURNET, NICOLAS NAUDE, FRANCOISE MASSINES, LAPLACE - Universite de Toulouse - CNRS/UPS/INP — In this paper we compare two different discharges that can be obtained in a DBD configuration, that is to say the filamentary discharge (usual regime in atmospheric DBD) with the Atmospheric Pressure Townsend Discharge (APTD), which is a homogeneous regime obtained in nitrogen atmosphere. The aim is to help in the understanding of the processes which control the transition from one regime to the other. To do so, the discharge is characterized through electrical measurements, coupled with optical diagnostics among which Laser Induced Fluorescence (LIF) for radical density measurements. The influence of the addition of small quantities of additives on the stability of the N₂ APTD is followed: the absolute density of N, O and NO are reported in N₂/O₂ and N₂/N₂O mixtures. One interesting result is that while the electron density is much lower in the APTD than in the filamentary discharge, the Townsend discharge is really efficient for the creation of N atoms: densities as high as $3 \times 10^{14} \text{ cm}^{-3}$ has been measured. These measurements are used to validate numerical models presented in paper “Homogeneous DBD in N₂: II. Simulation in 0D and 1D approaches” by S. Pancheshnyi et al.

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