

Abstract Submitted
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Optical and electrical characteristics of hollow-needle to plate atmospheric-pressure discharge in nitrogen¹ MILAN SIMEK, JIRI SCHMIDT, Institute of Plasma Physics, Academy of Sciences of the Czech Republic, Za Slovankou 3, 18221 Prague 8, Czech Republic, STANISLAV PEKAREK, JOSEF KHUN, Czech Technical University, FEE, Technicka 2, 16627 Prague 6, Czech Republic — We have studied basic optical and electrical characteristics of the DC hollow needle to plate electrical discharge enhanced by the gas flow through the needle. Substantial advantage of this arrangement is that all gas supplied to the discharge passes through the discharge zone and therefore it is affected by plasma chemical processes. Depending on the energy dissipated between electrodes, we previously observed two basic discharge regimes: a) DC corona and b) DC corona superimposed with pulsed filamentary streamers [1]. In this work, we have analyzed radiation induced by filamentary streamers. In addition to nitrogen emissions driven by electron impact processes we have detected emission induced by specific energy transfer processes [2]. We have also determined mean repetition frequency of filamentary streamers (0.1-15 kHz) for the needle-to-plane gap and for the nitrogen flow through the needle ranging between 2-6 mm and 1-10 slm, respectively. [1] M. Simek and S.Pekarek, GEC 2005, Bul. Am. Phys. Soc. 50, 29, (2005) ; [2] M. Simek et al, Pure Appl. Chem. 78, 1213, (2006).

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