

Abstract Submitted
for the GEC06 Meeting of
The American Physical Society

Dynamic of the plasma current amplitude in a barrier discharge: influence of a photocatalytic material O. GUAITELLA, S. CELESTIN, A. ROUSSEAU, LPTP, Ecole Polytechnique, CNRS, Palaiseau, France, A. BOURDON, EM2C, Ecole Centrale, CNRS, Chatenay, France — For a better understanding of the plasma/photocatalytic material interaction under plasma exposure, a study of the electrical properties of a cylindrical sinusoidal dielectric barrier discharge (DBD) is performed with and without porous material containing TiO₂. The metallic inner electrode is in contact with the gas gap. The presence of porous material made of silica fibres coated with nanoparticles of TiO₂ leads to a strong increase of the injected energy for the same applied voltage. For the same injected energy the time evolution of the current amplitude distribution function (CADF) shows two different peak populations on the positive half period (when the metallic inner electrode is positive) [1]. Apart from numerous low intensity plasma filaments (around 1 mA amplitude), much larger ones exist (around 1 A). These large current amplitude peaks are responsible for 50 to 70% of the injected energy depending on the presence of the photocatalytic material. They are attributed to desorption of charges triggered by light emitted by a first filament. The influence of 900 ppm of C₂H₂ as well as external ultraviolet irradiation on the CADF is also reported.
[1] O. Guaitella, F. Thevenet, C. Guillard, A. Rousseau J. Phys. D : appl. Phys (2006) accepted.

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Date submitted: 15 Jun 2006

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