Abstract Submitted
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Investigation of the development of a pulsed positive discharge in micrometer size confined dielectric geometries P. LE DELLIOU, P. TARDIVEAU, P. JEANNEY, F. JORAND, S. PASQUIERS, LPGP-CNRS-UPS, Orsay, France, DIREBIO TEAM — The development of a pulsed positive corona discharge in micrometer size confined dielectric geometries is investigated. The aim of this work is to understand how the plasma can develop inside confined geometries, representative of catalyst media in plasma enhanced catalysis applications. The reactor geometry is a point to plane one with a tungsten tip of 50μm diameter. The applied voltage ranges from 8kV to 18kV and is applied during 20ns. Time resolved imaging diagnostics coupled to microprobes current techniques are used to characterize the propagation either in transparent media (glass capillaries), or in opaque media (alumina). Round capillaries of inner diameters from 75μm up to 2mm and "hybrid" shapes such as rectangular tubings or square tubings are investigated. Discharge mean velocities are derived and in the case of capillaries, a maximum is found for a 200 μm inner diameter whatever the applied voltage. Discharge optical emission gets more homogeneous with smaller diameters; a tubular shaped propagation develops for intermediate capillaries and filamentary discharges are observed for larger ones. In the case of hybrid shapes, the propagation seems to be enhanced at the edges of the tube. Dielectric surfaces effects on ionization and recombination processes are considered to interpret these results.

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