DESIGN OF A WIRE-TO-PLATE POSITIVE PULSED CORONA DISCHARGE REACTOR BY LIF MEASUREMENTS[a]

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LIF was an effective method of detecting radicals[1.2]. In this study, two-dimensional OH radical distributions of different wire-to-plate pulsed corona discharge reactors were measured by using planar laser-induced fluorescence (PLIF) system. The effects of distance between wire electrodes and wire to plate of reactors on OH generation were investigated. Results provided one of theoretical bases for design of a discharge reactor in term of OH distribution. In the experiments, stainless steel wires with 1mm diameter were used as electrodes; the required 282nm laser used to excite OH radicals was generated by double frequency with an output energy of 8mJ $pulse^{-1}$. We also tracked the wave shapes of the voltages and currents in pulsed corona discharge with high voltage and current probes.

Experiments results indicated that decreasing wire-to-plate distance leads to decreasing of pulse rise time and increasing of pulse energy and OH radical generation. The wire-to-wire distance has little influence on discharge voltage. In addition, LIF measurements indicated OH radical generation can be achieved to maximum when wire-to-wire and wire-to-plate distances of a reactor in optimum ranges. The investigation on the influence of electrodes distances on the removal efficiencies of SO_2 and NO was used to verify the above results.

References:

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