

Dielectric Barrier Discharges for Gas Treatment

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Treatment of NO_x pollutants in the gas outlet of various industrial processes, by mean of non-thermal plasma has been studied in several past works and has exhibited interesting prospects. Reactor design and plasma/catalyst mixed systems have been recently the main directions investigated for performances improvement. Nevertheless, improvements in electrical energy injection control by means of the power supply are still required to achieve efficient practical applications.

In order to carry parametric investigations, concerning different DBD reactors and power supplies, an automated test-bench has been set-up and is presented: it comprises a control apparatus for inlet gas mixture and flow, a real time measurement module for all electrical variables and for gas analysis, a data acquisition interface and a fully controlled power supply, delivering square current pulses.

This square current source can control the electrical power of the DBD by means of three degrees of freedom (frequency, amplitude and duration of the current pulses), and the system is used to perform automatic sweeps of these electric variables, saving the results of each experiment. Details about the operating principle of the power supply and its design are going to be presented as well as test bench experimental results and NO_x destruction performances.

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