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Control of the energy deposited in a high voltage nanosecond discharge and combustion triggering in $N_2/O_2/C_3H_8$ mixtures at atmospheric pressure NICOLAS MOREAU, SABRINA BENTALEB, PHD student, PIERRE TARDIVEAU, doctor, CHRISTIAN POSTEL, FRANÇOIS JORAND, engineer, STEPHANE PASQUIERS, doctor — The energy control in a point to plane corona discharge induced in dry air under nanosecond scale high overvoltage is investigated. The spatial behaviour of the discharge is described by CCD imaging coupled to energy measurements. The energy is modified by varying the voltage and the pulse duration. In previous works we obtained a diffuse regime and a streamer regime are obtained below 3 bar, and a leader-like regime above. In the diffuse regime, the discharge constricts in the point-plane axis when the energy increases while intensification of the emission can be observed on one or more filaments in the streamer one. The energy can be controlled till a pulse duration limit greater for the streamer regime than for the diffuse one. Below this duration limit, the current pulse ends with the voltage pulse. Difficulties appeared to control the energy in the leader-kind regime. The combustion triggering of $N_2/O_2/C_3H_8$ mixtures by one pulse and the flame propagation are studied at 1 bar. The diffuse regime disappears in mixtures with C_3H_8 and the discharge is a filamentary one. Combustion always triggers near the tip with a lower energy deposited limit of a few millijoules.

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