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Kinetics of pulsed DC discharge in $N_2/O_2/N_xO_y$ mixtures studied by quantum cascade laser absorption spectroscopy DANIIL MARINOV, OLIVIER GUAITELLA, ANTOINE ROUSSEAU, LPP, Ecole Polytechnique, UPMC, Université Paris Sud-11, CNRS, Palaiseau, France, MARKO HUEBNER, JURGEN ROEPCKE, INP- Greifswald, Felix-Hausdorff-Str. 2, 17489 Greifswald, Germany — In this work we study the kinetics of NO, NO_2 and N_2O in a pulsed low pressure ($\sim$1.3 mbar) DC discharge in N_2 and N_2/O_2 using *in-situ* QCLAS absorption. Gas mixture of 1% NO, NO_2 or N_2O in pure N_2 or air is exposed to a single plasma pulse (1-10ms, 25-150 mA). In pure N_2 plasma, NO and NO_2 are destroyed completely within few ms after the beginning of the pulse. In air plasma NO_2 is transformed into NO while NO concentration reaches a steady state. N_2O destruction in both cases is 10 times slower while N_2O in the discharge undergoes strong vibrational excitation. Vibrational relaxation of N_2O in the post-discharge occurs within several 10s of ms, indicating the presence V-V$^{'}$ transfer from N_2(v). In this way one can use N_2O as an indicator of the excitation of IR inactive N_2 and follow the relaxation of vibrational temperature of N_2. Laser absorption measurements are strongly influenced by the effect of gas heating, so measurements of T_g using N_2 (2^+) emission are underway.

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