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Study of NO formation in a low pressure air-like plasmas at single pulse operation SERGEJ GORCHAKOV, MARKO HÜBNER, JÜRGEN RÖPCKE, DETLEF LOFFHAGEN, INP Greifswald, Felix-Hausdorff-Str. 2, 17489 Greifswald, Germany, DANIIL MARINOV, OLIVIER GUAITELLA, ANTOINE ROUSSEAU, LPP, Ecole Polytechnique, UPMC, Université Paris Sud-11, CNRS, 91128 Palaiseau Cedex, France — The NO formation in low pressure N₂-O₂ plasmas has been studied for a single rectangular pulse using quantum cascade laser (QCL) absorption spectroscopy. To measure sensitive species concentrations with a time resolution in the microsecond range, a new spectroscopic technique based on QCL has been used. Absolute number densities of NO molecules have been obtained taking into account the influence of spectral distortions due to fast spectral scanning, i.e., rapid passage effect. The duration of the pumping pulse was about 5 ms for discharge currents between 50 and 150 mA. The theoretical analysis has been performed by means of a self-consistent model comprising the coupled solution of the time-dependent electron Boltzmann equation, a system of rate equations for various heavy particles and a current balance equation. Results for air-like plasmas are represented both for the active discharge phase and the afterglow. The modelling results show qualitative agreement with experimental data, while the density of NO molecules is underestimated compared to measurements. Possible reasons of this discrepancy are discussed.

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