

## **Keep-in-Touch VIP meeting (November 2, 2021, 4.30pm)**

### **Vibrational kinetics of CO<sub>2</sub> in non-thermal plasma: a diagnostic study**

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Vibrational excitation is seen as the panacea for efficient CO<sub>2</sub> dissociation in plasma. During the presentation I will discuss the development of diagnostic techniques to increase our current level of understanding of the vibrational kinetics within CO<sub>2</sub> discharges, with the intention to ultimately contribute to a controlled and efficient dissociation process in plasma. The diagnostic techniques are time-resolved *in situ* Fourier transform infrared (FTIR) spectroscopy, quantum cascade laser absorption spectroscopy, and spatiotemporally resolved *in situ* rotational Raman spectroscopy. These techniques are used to obtain information about the ro-vibrational density distributions in the electronic ground state of CO<sub>2</sub> in a pulsed glow discharge. During the active part of the plasma pulse a clear non-equilibrium is observed between the rotational and the  $v_3$ , and the  $(v_1, v_2)$  and  $v_3$  vibrational density distributions. The results provide ample experimental foundation to expand our knowledge on CO<sub>2</sub> vibrations and dissociation, especially through comparison with numerical models.

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