Abstract Submitted
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The role of O atoms in CO_2 plasma kinetics[1] OLIVIER GUAITELLA, ANA-SOFIA MORILLO-CANDAS, LPP, CNRS, Ecole Polytechnique, UPMC, Universite Paris-Saclay, 91128 Palaiseau, France, TIAGO SILVA, POLINA OGLOBLINA, VASCO GUERRA, Instituto de Plasmas e Fusao Nuclear, Instituto Superior Tecnico, Universidade de Lisboa, 1049-001 Lisboa, Portugal — Using CO_2 as a raw material instead of treating it as waste is one of the biggest challenges today. Raising it would both create a true green chemistry on Earth, and provide a source of O_2 for space missions on Mars. The interest of converting CO2 by plasma relies on the efficiency of the asymmetric stretch vibrational mode excitation, and on the control of the processes involving O atoms. Indeed O atoms can be responsible both for quenching of vibrationally excited CO_2, and for back reaction with CO. We have used time resolved in situ FTIR to obtain vibrational temperature of CO_2 and CO in a pulsed glow discharge with and without SiO_2 fibers on the wall. This porous material allows having a complete recombination of O atoms which has been confirmed by actinometry and TALIF measurements. By removing the O atoms, their influence on the vibrational temperatures and the conversion rate of CO_2 has been studied. In order to investigate deeper the O atoms exchange rate between CO and CO_2, isotopic measurements are also performed with IR absorption.

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Olivier Guaitella
LPP, CNRS, Ecole Polytechnique, UPMC, Universite Paris-Saclay

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