

Abstract Submitted  
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**Selfconsistent Vibrational and Free Electron Kinetics in Reacting CO<sub>2</sub>/CO Plasmas** LUCIA DANIELA PIETANZA, GIANPIERO COLONNA, MARIO CAPITELLI, PLASMI Lab CNR NANOTEC Bari — A self-consistent time-dependent model based on the coupling between the Boltzmann equation for free electrons, the non equilibrium vibrational kinetics for the asymmetric mode of CO<sub>2</sub> and for CO vibrational levels and simplified global models for the dissociation and ionization plasma chemistry is applied to conditions met under pulsed microwave, dielectric barrier discharge and nanosecond pulsed discharges. The results show that, in MW conditions, large concentrations of vibrational excited states are generated, which affect the electron energy distribution function through superelastic vibrational collisions. Moreover, in discharge and post-discharge conditions, the vibrational distribution functions of both CO<sub>2</sub> and CO are characterized by plateaux due to V-V up pumping mechanism. These plateaux promote dissociation processes by pure vibrational mechanisms, which can overcome the electron impact dissociation rates. The eedf in post-discharge conditions shows characteristic plateaux due to superelastic processes involving the electronic excited states of the species of both CO<sub>2</sub> and CO species.

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