Abstract Submitted
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Characterization of Atmospheric Pressure Carbon Dioxide Dissociation in Arrays of Microplasma Channels by Emission Spectroscopy and Effluent Analysis[1] ZHEN DAI, CHUL SHIN, SUNG-JIN PARK, JAMES GARY EDEN, University of Illinois at Urbana-Champaign — Levied by rigorous regulations, the enormous cost of atmospheric carbon dioxide emission urged voracious demands on remediation technologies globally. Microplasma technology is being investigated as a new candidate to efficiently dissociate or remediate carbon dioxide contained in atmosphere. At a flow rate of 60 sccm of pure CO_2 feedstock gas, dissociation degree of up to 14% has been achieved with stable glow discharges in an array of Al/Al_2O_3 microplasma channels. In-situ characterizations of the effluent gases were conducted with residual gas analysis, gas chromatography, and infrared spectroscopy. Furthermore, time and spatially resolved emission spectroscopy recorded with an intensified charge-coupled device in the 300-800nm region revealed the excitation of CO and C_2 species. The implications on the possible plasma chemistry and its reaction mechanisms in the microdischarge will be discussed.

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