Abstract Submitted
for the GEC19 Meeting of
The American Physical Society

Zero-dimensional simulation of He and He/O_2 microscale atmospheric pressure plasma jet: Role of the vibrationally excited O_2[1] YOUFAN HE, ANTHONY ETIENNE EZEABASILI, EFE KEMANECI, Institute for Theoretical Electrical Engineering, Ruhr University Bochum, Germany, INSTITUTE FOR THEORETICAL ELECTRICAL ENGINEERING TEAM — Reactive oxygen species at high concentrations produced in microscale atmospheric pressure plasma jet remains at room temperature, which is particularly suitable for biomedical applications. The chemical kinetics of such species is analyzed by a developed zero-dimensional(volume-averaged) global model based on particle and electron energy balance equations. The simulation results are benchmarked against the available measurement data of He and He/O_2 plasma. The wall recombination of O plays an important role in O and O_3 concentration. The most dominant reaction for O_3 production is the three-body reaction of He, O, and O_2. The vibrational kinetics of O_2 has a negligible influence on O density, electron density, and electron temperature.

[1]funded by DFG(German Research Foundation)

Youfan He
Institute for Theoretical Electrical Engineering, Ruhr University Bochum

Date submitted: 28 May 2019 Electronic form version 1.4