Abstract Submitted
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One-dimensional plasma chemistry model for parallel plate dielectric barrier discharges (DBDs) and conversion to volume averaged model[1] CHANGHO YI, SUNG-YOUNG YOON, SANGHEUM EOM, SEUNGIL PARK, SEUNGMIN RYU, SEONG BONG KIM[2], Plasma Technology Research Center, National Fusion Research Institute — The volume averaged plasma chemistry models (0D models) commonly assumed spatially homogeneous Gaussian-like pulsed electric fields (SHGP E-fields) to calculate the transient behaviors of microdischarges and chemistry. Thus discharges were also homogeneous, and their characteristics depended on the E-field only. However, for volume microdischarges such as parallel plate DBDs (PP-DBDs), the discharge characteristics depend on the electrode geometries, e.g. as gap distance, as well as E-fields, and the microdischarges in air generally do not fill entire volume of PP-DBDs for one period. Thus, for PP-DBDs, the characteristics of E-field may need some adjustments to properly reflect the characteristics of microdischarges while keeping the assumption of SHGP E-fields. In this paper, PP-DBDs in humid air were numerically investigated by using the 0D and 1D fluid models, and the characteristics of SHGP E-fields of the 0D model were adjusted. Finally, transient behabiors of plasma chemistries were calculated by using the adjusted 0D model and compared with those of experiments.

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[2]Corresponding author

Changho Yi
Natl Fusion Res Inst

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