Abstract Submitted
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Influence of surface parameters on DBDs in argon at subatmospheric pressure[1] M. STANKOV, M.M. BECKER, R. BANSEMER, D. LOFFHAGEN, Leibniz Institute for Plasma Science and Technology, Felix-Hausdorff-Str. 2, 17489 Greifswald, Germany — The properties of the isolating surface in dielectric barrier discharges (DBDs) strongly influence the DBD's characteristics. However, e.g. the secondary electron emission coefficient and permittivity of the dielectric are usually not very well known. This is particularly a problem if numerical modeling is applied to optimize specific devices. This contribution reports on a time-dependent, spatially one-dimensional fluid model of a DBD device operated in the pressure range from 100 to 1000 mbar. For model verification and validation, argon is used as reference gas. The model comprises balance equations for the 1s and 2p levels of atomic argon, excimers, atomic and molecular ions and electrons. Furthermore, electron energy and surface charge balances as well as Poisson's equation are involved. Model calculations have been carried out for different values of the secondary electron emission coefficient and permittivity of the quartz dielectric. For validation of the model, current measurements have been performed and the experimental data are compared to the modeling results. It was found that specific discharge features observed in the experiment like, e.g., multipeak behavior, can only be reproduced by the model if correct surface properties are chosen.

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