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Comparison of a Global Model to Semi-Kinetic Fluid Simulations for Atmospheric Pressure Radio- Frequency Capacitive Discharges KARI NIEMI, DEBORAH O'CONNELL, TIMO GANS, York Plasma Institute, Department of Physics, University of York, York YO10 5DD, UK — A global model of a homogeneous plasma bulk oscillating between electron-free rf sheaths is developed. Particle and power balance, including ohmic heating loss for bulk electrons and ions in the sheaths, yields bulk electron temperature and density. Explicit time dependence of the reduced bulk electric field and, correspondingly, of the total ionization rate and electron transport coefficients is accounted for. Results as a function of the rf power density for a gas mixture of 0.5 vol% oxygen in helium at atmospheric pressure within a 1mm discharge gap are presented and compared to a 1D-fluid simulation, which is capable to describe the electron dynamics despite of a limited plasma-chemical reaction scheme. The quality of agreement is critically analysed and correlated to the individual global model assumptions. Possibilities of coupling the global model to comprehensive discharge chemistry models are discussed.

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