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Zero Dimensional Model for the Investigation of Dielectric Barrier Discharges in Humid Air ANTHONY EZEABASILI, YOUFAN HE, KEMANECI EFE, Ruhr University Bochum — This investigation is about applying a nanosecond power to a dielectric barrier discharge in humid air at atmospheric pressure.A number of 53 species and 624 reactions were considered in describing the chemistry of the system. The model involves two dependent discharge (comprising of charged and fast neutral species) and after glow (slow neutrals) regions solved on different time scales given the varied lifetime of the species in the considered regions. The particle and electron energy balance equations are the salient equations which are solved dependently under the time varying power in the system. The model gives further insight into the chemical dynamics of the species. This is because the electron energy is accounted for by the energy balance equation. It could also be calculated from conventional electron energy distribution function that Boltzmann solvers can easily be used for. The model finds good agreement with proven experimental results on the density of species within the plasma region and in the effluent gas regime and thus a powerful tool in plasma simulation.

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