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A Computational Diagnostics for Dielectric Barrier Discharge Plasma

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Abstract : In this paper, the characteristics of electric discharge in gap between two (parallel-plate) dielectric plates are studies, the gap filled with Argon gas in atm pressure at ambient temperature, the thickness of gap typically less than 1 mm and dielectric may be up 10 cm in diameter. One of dielectric plates a sinusoidal voltage is applied with Rf frequency, the other plates is electrically grounded. The simulation in this work depending on Boltzmann equation solver in first few moments, fluid model and plasma chemistry, in one dimensional modeling. This modeling have insight into characteristics of Dielectric Barrier Discharge through studying properties of breakdown of gas, electric field, electric potential, and calculating electron density, mean electron energy, electron current density ,ion current density, total plasma current density. The investigation also include: 1. The influence of change in thickness of gap between two plates if we doubled or reduced gap to half. 2. The effect of thickness of dielectric plates. 3. The influence of change in type and properties of dielectric material (gass, silicon, Teflon).

Keywords : computational diagnostics, Boltzmann equation, electric discharge, electron density
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