

Abstract Submitted
for the GEC10 Meeting of
The American Physical Society

Modeling of electron transport parameters in methane and air mixture gas HARUAKI AKASHI, National Defense Academy, KOICHI SASAKI, Hokkaido University — Recently, plasma-assisted combustion [1] has been focused on due to achieving more efficient way of fossil fuels combustion, reducing pollutants and so on. Shinohara et al [2] has reported that the flame length of methane and air premixed burner shortened by irradiating microwave power without increase of gas temperature. So it is suggested that this phenomena may result by the electron heating of non-equilibrium plasma. To clarify this phenomena, electron behavior under microwave power should be examined. For the first step, electron Monte Carlo simulation in methane and air mixture gas has been done. The electrons swarm parameters are sampled and electron energy distribution function(eedf) is also determined. The transport parameters under microwave power in atmospheric pressure have been reached to equilibrium condition very fast. It is obvious that the electrons are accelerated by the high frequency electric field, and most of the electrons stay in low energy region. But there are a few high energy electrons($>15\text{eV}$). These electrons might be the key for the plasma-assisted combustion.

[1] V.Bychkov et al. IEEE Trans. Plasma Sci.,37,12 2280-2285(2009)

[2] K. Shinohara et al, J. Phys. D:Appl. Phys., 42, 182008 (1-7) (2009)

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Date submitted: 14 Jun 2010

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