World Academy of Science, Engineering and Technology
International Journal of Nuclear and Quantum Engineering
Vol:12, No:07, 2018

Electrohydrodynamic Study of Microwave Plasma PECVD Reactor

Authors : Keltoum Bouherine, Olivier Leroy

Abstract : The present work is dedicated to study a three–dimensional (3D) self-consistent fluid simulation of microwave discharges of argon plasma in PECVD reactor. The model solves the Maxwell's equations, continuity equations for charged species and the electron energy balance equation, coupled with Poisson's equation, and Navier-Stokes equations by finite element method, using COMSOL Multiphysics software. In this study, the simulations yield the profiles of plasma components as well as the charge densities and electron temperature, the electric field, the gas velocity, and gas temperature. The results show that the microwave plasma reactor is outside of local thermodynamic equilibrium.The present work is dedicated to study a three–dimensional (3D) self-consistent fluid simulation of microwave discharges of argon plasma in PECVD reactor. The model solves the Maxwell's equations, continuity equations for charged species and the electron energy balance equation, coupled with Poisson's equation, and Navier-Stokes equations by finite element method, using COMSOL Multiphysics software. In this study, the simulations yield the profiles of plasma components as well as the charge densities and electron temperature, the electric field, the gas velocity, and gas temperature. The results show that the microwave plasma reactor is outside of local thermodynamic equilibrium.

Keywords : electron density, electric field, microwave plasma reactor, gas velocity, non-equilibrium plasma
Conference Title : ICNPRE 2018 : International Conference on Nuclear, Plasma and Radiological Engineering
Conference Location : Dublin, Ireland
Conference Dates : July 23-24, 2018