Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Modeling of a microwave plasma enhanced chemical vapor deposition system based on finite element method[1] YILANG JIANG, KAVIYA ARANGANADIN, MING-CHIEH LIN, Department of Electrical and Biomedical Engineering, Hanyang University, Seoul 04763, South Korea, JING-SHYANG YEN, Department of Electronic Engineering, National Taipei University of Technology, Taipei 10608, Taiwan, HUA-YI HSU, Department of Mechanical Engineering, National Taipei University of Technology, Taipei 10608, Taiwan — Microwave Plasma Enhanced Chemical Vapor Deposition (MPECVD) films have excellent electrical properties and good substrate adhesion. It is one of the promising candidates for synthetic CNTs due to vertical growth, low temperature and large area growth. The plasma consisting of ionized gas species and electrons is ignited and sustained by applying high electromagnetic power at microwave frequencies so a thin film can be deposited at lower temperature but higher efficiency. It also gained popularity in diamond fabrication. This paper discussed the design and modeling of MPECVD chamber operated at 2.45 GHz frequency using finite element method simulation. The design consists of a coaxial waveguide and a cylindrical chamber at the center connected with 4 identical slots in each direction. The placement of slot affects the resonant mode in the chamber. Both TE_{111} and TM_{011} modes in the inner chamber are employed to generate the plasma at 2.45GHz and the corresponding analysis of the MPECVD operated at different pressure and input power has been performed for industrial applications.

[1]This work was supported by the research fund of HYU (HY-201400000002393) and NRF, Korea and NTUT, Taiwan.

Yilang Jiang
Hanyang University

Date submitted: 10 Jul 2019 Electronic form version 1.4