PT-P007

Three-Dimensional Particle-in-cell Simulation of Electron Cyclotron Resonance Plasma with Belt-type Magnet Assembly

Hui Jea Lee[1,2], Seong Bong Kim[2], Suk Jae Yoo[2], Moohyun Cho[1,3], Won Namkung[4]

[1]Dept. of Physics, POSTECH, [2]National Fusion Research Institute,
[3]Division of Advanced Nuclear Engineering, POSTECH, [4]Pohang Accelerator Laboratory

The electron cyclotron resonance plasma source with a belt-type magnet assembly (BMA) is designed for effective plasma confinements. For characterizing the plasma source, the plasma parameters are measured by Langmuir probe. However, the plasma parameters and the motion of charged particles near the ECR zone are not easy to diagnostics, because of the high plasma density and temperature. Thus, as an alternative method, the electromagnetic simulation of the plasma source has been performed by using three-dimensional particle-in-cell and Monte Carlo collisional (PIC-MCC) simulation codes. For considering the limitation of simulation resources and time, the periodic boundary condition is applied and the coulomb collision is neglected. In this paper, we present the results of 3D PIC simulations of ECR plasmas with BMA and we compare them with the experimental results.

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Keywords: ECR plasma, PIC simulation

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A Study on the Characteristics of Ammonia Doped Plasma Polymer Thin Film with a Controlled Plasma Power

서현진[1], 황기환[2], 주동우[2], 유정훈[1], 이진수[1], 전소현[1], 남상훈[2], 윤상호[2,3], 부진효[1,2]

[1]성균관대학교 화학과, [2]성균관대학교 기초과학연구소, [3]Royal Institute of Technology

Plasma-polymer thin films (PPTF) have been deposited on a Si(100) wafer and glass under several conditions such as different RF power by using plasma-enhanced chemical vapor deposition (PECVD) system. Ethylcyclohexane, ammonia gas, hydrogen and argon were utilized as organic precursor, doping gas, bubbler gas and carrier gases, respectively. PPTFs were grown up with RF (ratio frequency using 13.56 MHz) powers in the range of 20～60 watt. PPTFs were characterized by FT-IR (Fourier Transform Infrared), FE-SEM (Scanning Electron Microscope), AFM (Atomic Force Microscope), Contact angle and Probe station. The result of FT-IR measurement showed that the PPTFs have high cross-link density nitrogen doping ratio was also changed with a RF power increasing. AFM and FE-SEM also showed that the PPTFs have smooth surface and thickness. Impedance analyzer was utilized for the measurements of C-V curves having different dielectric constant as RF power.

Keywords: PECVD, Ammonia, plasma polymer