

Analysis of H-ICP Source by Noninvasive Plasma Diagnostics of Etching Process

Kun Joo Park¹, Min Shik Kim¹, Kwang Min Lee¹, Heeyeop Chae², Hi-Deok Lee³

¹DMS Co., Ltd, Suwon, Korea 443-803, ²Dept. of Chemical Eng., SungKyunKwan Univ., Suwon ,
Korea 440-746, ³ Dept. of Electronics Eng., Chungnam National Univ., Daejeon, Korea 305-764

Tel : 82-42-821-6868, Fax : 82-42-823-9544, E-mail :hdlee@cnu.ac.kr

Abstract : Noninvasive plasma diagnostic technique is introduced to analyze and characterize HICP (Helmholtz Inductively Coupled Plasma) source during the plasma etching process. The HICP reactor generates plasma mainly through RF source power at 13.56MHz RF power and RF bias power of 12.56MHz is applied to the cathode to independently control ion density and ion energy. For noninvasive sensors, the RF sensor and the OES (Optical emission spectroscopy) were employed since it is possible to obtain both physical and chemical properties of the reactor with plasma etching. The plasma impedance and optical spectra were observed while altering process parameters such as pressure, gas flow, source and bias power during the poly silicon etching process. In this experiment, we have found that data measured from these noninvasive sensors can be correlated to etch results. In this paper, we discuss the relationship between process parameters and the measurement data from RF sensor and OES such as plasma impedance and optical spectra and using these relationships to analyze and characterize H-ICP source.