

Abstract Submitted
for the GEC07 Meeting of
The American Physical Society

Measurement of Absolute Carbon Atom Density in Reactive Plasmas using Vacuum Ultraviolet Absorption Spectroscopy with Microdischarge Hollow Cathode Lamp HAJIME SASAKI, SEIGO TAKASHIMA, MASARU HORI, Nagoya University — Carbon atoms play an important role in the reactive plasma processes such as carbon nanostructure formation, etching and so on. In order to realize the smart plasma processing, it is very important to measure the absolute C atom density in the process plasma using carbon based gasses, because the C atoms have a high sticking coefficient. We have developed a measurement technique for absolute C atom densities using a vacuum ultraviolet absorption spectroscopy (VUVAS) employing a microdischarge hollow cathode lamp (MHCL). Helium gas containing a small amount of CO₂ gas was used as the gas of the MHCL. The transition lines $2p3s^3p_2-2p^{23}P_2$ at 165.7 nm were used for C atom measurements. By using VUVAS system, we measured the absolute C atom density in the CO-ICP at the pressure of 8.0 Pa. The densities increased from 1.7×10^{11} to 9.5×10^{13} cm⁻³ when the RF power increased from 10 to 1000 W. his measurement method will be useful for the plasma processing for synthesise a diamond like carbon, carbon nanotube and so on.

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Date submitted: 15 Jun 2007

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