Abstract Submitted
for the GEC09 Meeting of
The American Physical Society

Behavior of hydrogen atoms in plasma enhanced chemical vapor deposition of microcrystalline silicon film YUSUKE ABE, SHO KAWASHIMA, Nagoya University, KEIGO TAKEDA, MAKOTO SEKIN, MASARU HORI, Nagoya University, JST-CREST — Microcrystalline silicon (μc-Si) thin film grown by low temperature plasma enhanced chemical vapor deposition (PECVD) is an attractive material for applications in large area electronics and optoelectronics especially on flexible plastic substrates. In the PECVD processes for the gμc-Si film formation, conditions with high pressure (1 Torr $\sim$) and high H_2-dilution of SiH_4 are widely appropriated. Hence, the role of H atoms is very important to fabricate highly crystallized μc-Si film, however their behavior in the gas phase has not been clarified yet. In this study, we measured the absolute density and translational temperature of H atoms in a very high frequency capacitilvely coupled plasma (VHF-CCP) source at high pressure by using vacuum ultraviolet laser absorption spectroscopy (VUVLAS). The VHF power and the flow rate of SiH_4/H_2 gas were fixed at 500 W and 5/495 sccm, respectively. The pressure was varied from 0.5 Torr to 7 Torr. The absolute density increased 4.1×10^{12} cm^{-3} to 9.0×10^{12} cm^{-3} and translational temperature increased from 500 to 1600 K with increasing pressure.

Yusuke Abe
Nagoya University

Date submitted: 15 Jun 2009 Electronic form version 1.4