Abstract Submitted
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Multi-hollow discharge plasma CVD reactor with magnets for highly stable a-Si:H film deposition KAZUNORI KOGA, WILLIAM M. NAKAMURA, HIROSHI SATOU, HIROOMI MIYAHARA, MASAHARU SHIRATANI, Kyushu University — Incorporation of amorphous silicon nanoparticles (clusters) has been related to a-Si:H films' light induced degradation [1]. In the present work, we have developed a multi-hollow discharge plasma CVD reactor in which we introduced magnets into the electrode to produce a magnetic field (400 G) along the holes' axis to increase the confinement of electrons of low kinetic energy <10eV. Due to such selective confinement of electrons, the generation rate of SiH_3 radicals, which is the main precursor of good films, increases; while the generation rate of SiH_2, which forms clusters, is reduced. By applying the magnetic field, we have obtained a deposition rate 20-100% higher than that without the magnetic field. Moreover, the volume fraction of clusters in films deposited in the downstream region is 14-80% lower when applying the magnetic field. These results indicate that a-Si:H of high stability can be deposited at high rate by applying the magnetic field to the electrodes.

[1] M. Shiratani, K. Koga, N. Kaguchi, K. Bando, and Y. Watanabe, Thin Solid Films, **506-507**, 17 (2006).

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