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Control of deposition profile of plasma CVD hard carbon films on substrates with trenches MASAHARU SHIRATANI, Kyushu University, JST, CREST, JUN UMETSU, KAZUHIKO INOUE, TAKUYA NOMURA, HIDEFUMI MATSUZAKI, Kyushu University, KAZUNORI KOGA, Kyushu University, JST, CREST, YUICHI SETSUHARA, Osaka University, JST, CREST, MAKOTO SEKINE, MASARU HORI, Nagoya University, JST, CREST — We have realized sub-conformal, conformal and anisotropic deposition profiles of Cu in trenches by plasma CVD [1]. Here we report control of deposition profile of carbon films by plasma CVD. Experiments were performed using a H-assisted plasma CVD reactor in which a 28 MHz capacitively-coupled main discharge and a 13.56 MHz inductive-coupled discharge for an H atom source were sustained. Toluene diluted with H2 was supplied at a flow rate of 90 sccm. The total pressure of reactor was 13 Pa. To study dependence of deposition rate on a ratio of ion flux to radical flux, substrates were covered with a piece of mesh of 10-50 mesh/inch at 1-5 mm above the substrates. *Without a mesh* the deposition rates at the top, bottom, and sidewall of a trench of the aspect ratio of 1.2 are 20.4, 16.3, and 3.57 nm/min, whereas the corresponding values are 11.7, 9.17, and 3.31 nm/min *with* a piece of mesh of 14 mesh/inch and 60.8% transparency, set 1 mm above the substrate. The deposition profile can be controlled by the ratio of ion flux to radical flux. [1] K. Takenaka, et al. Pure Appl. Chem. **77**, 391 (2005).

Masaharu Shiratani
Kyushu University, JST, CREST

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