Abstract Submitted
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Deposition profile control of carbon films on trenched substrate by simultaneous plasma CVD and plasma etching[1] MASAHARU SHIRATANI, TATSUYA URAKAWA, DAISUKE YAMASHITA, KUNIHIRO KAMATAKI, NAHO ITAGAKI, GIICHIRO UCHIDA, KAZUNORI KOGA, Kyushu University, YUICHI SETSUHARA, Osaka University, MAKOTO SEKINE, MASARU HORI, Nagoya University — We have succeeded in realizing subconformal, conformal, and anisotropic deposition profiles of carbon films on trenched substrates by simultaneous plasma CVD and plasma etching. For anisotropic profile, we can deposit carbon films on trenched substrates in three ways, that is, films are deposited on the top without depositing films on the bottom and sidewall, films are deposited on to bottom without depositing films on the top and sidewall, and films are deposited on the top and bottom without depositing films on the sidewall. Such anisotropic deposition profiles can be obtained by tuning the balance between plasma CVD and plasma etching on each surface. Deposition takes place on surface where the deposition rate surpasses the etching rate. The deposition rate depends not only flux of carbon containing radicals but also ion flux, ion energy, and substrate temperature, whereas the etching rate depends not only H flux but also ion flux, ion energy, and substrate temperature. We need precise control of discharge plasmas to tune deposition profile as well as film properties.

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Masaharu Shiratani
Kyushu University

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