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Raman Spectroscopy of *a*-C:H Films Deposited Using Ar + H₂+ C₇H₈ Plasma CVD XIAO DONG, KAZUNORI KOGA, DAISUKE YAMASHITA, HYUNWOONG SEO, NAHO ITAGAKI, MASAHARU SHIRATANI, Kyushu University, YUICHI SETSUHARA, Osaka University, MAKOTO SEKINE, MASARU HORI, Nagoya University — We investigated the effects of ion energy on Raman spectra of *a*-C:H films prepared by Ar + H₂+ C₇H₈ plasma CVD. Raman spectra were measured with a laser Raman spectrometer (JASCO NRS-3100). Both the D-peak position and G-peak position shift toward higher wavenumbers as ion energy increases. The intensity ratio of the D-peak and G-peak, I_D/I_G increases with increasing the ion energy, indicating that the amount of ring-like sp^2 clusters increases. The H content in *a*-C:H derived from photoluminescence (PL) background decreases with increasing the ion energy. The full width at half maximum of the G-peak, $FWHM_G$ related to the C-C sp^3 content and H content increases with increasing the ion energy to 100 eV, whereas it decreases with increasing further the ion energy to 105 eV. The variation of $FWHM_G$ is consistent with that of mass density. These results indicate that the structure of *a*-C:H films transforms from polymer-like carbon to diamond-like one with increasing the ion energy above the threshold value of ~ 100 eV.

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