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Efect of discharge tube temperature on the densities of $N_2(A^3\Sigma_u^+)$ and atomic nitrogen in a remote nitrogen plasma source MASAHARU SHIMABAYASHI, Hokkaido Univ., KAZUAKI KURIHARA, Toshiba/Imec, KOICHI SASAKI, Hokkaido Univ. — We investigate the application of a remote nitrogen plasma source to the surface nitriding of SiC. In this work, we tried the control of the densities of reactive nitrogen species ($N_2(A^3\Sigma_u^+)$ and atomic nitrogen) by the temperature of the discharge tube. The remote nitrogen plasma was produced using a microwave resonator (2.45 GHz) which was installed on the outside of a discharge tube with an inner diameter of 8 mm. The microwave resonator was located at a distance of 7-16 cm from the measurement position. A part of the discharge tube between the resonator and the measurement position was heated up to 600 ^{o}C by applying a heating power to a kanthal spiral wire on the outside of the discharge tube. We observed the slight increase (several tens of percent) in the density of atomic nitrogen by the discharge tube heating. On the other hand, the density of $N_2(A^3\Sigma_u^+)$ decreased significantly (an order of magnitude) with the discharge tube temperature. These results indicate that the high temperature of the discharge tube affects the loss frequencies of atomic nitrogen and $N_2(A^3\Sigma_u^+)$ oppositely.

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