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High time-resolution spatial distribution measurement of the ion flux and the electron temperature in an inductively coupled pulse plasma JIHWAN PARK, MOOYOUNG LEE, DONGHWAN KIM, Department of Nanoscale Semiconductor Engineering, Hanyang University, CHINWOOK CHUNG, Department of Electrical Engineering, Hanyang University — The time-resolved spatial distribution of the plasma parameters are measured in the pulse-modulated inductively coupled argon discharge. During the initial active-glow period, the ion flux and the electron temperature beneath the antenna are higher than the center of the reactor. While the plasma is approaching a steady state active-glow, the spatial distributions of the ion flux and the electron temperature evolve a center-high profile. After the pulse is off, both the ion flux and the electron temperature are decreased maintaining their center-high profile. At the bottom surface, on the other hand, the center-high distribution profile is observed from the beginning of the active-glow, and maintained during the after-glow period. Compared to the continuous wave discharge, the spatial uniformity of the plasma parameters is improved during the active-glow period, and it is increased with the increasing pulse frequency. These spatial distribution characteristics can be explained by the discharge mechanism and the diffusion of charged particles, and it should be considered to achieve desirable process results in the pulse-modulated plasma material processing.

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