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Spatial distributions of the size and the density of Cu particulates in high–pressure magnetron sputtering plasmas N. NAFARIZAL, University Tun Hussein Onn Malaysia, N. TAKADA, K. SASAKI, Nagoya University — It has been observed that magnetron sputtering plasmas are sometimes dusty, namely, they contain a large amount of particulates when they are operated at gas pressures higher than $\sim$ 100 mTorr. In this work, we evaluated the spatial distributions of the size and the density of Cu particulates in the gas phase of a magnetron sputtering plasma source employing a Cu target. The evaluations of the size and the density were based on Rayleigh/Mie scattering of laser lights at two wavelengths of 457 and 672 nm. The size of particulates was estimated from the ratio of the scattered laser intensities, while the density was evaluated from the absolute intensity of the scattered laser light. A remarkable experimental result was that no Cu particulates were observed in the bright plasma region which was located near the target surface in all the discharge conditions. At an argon pressure of 400 mTorr and a discharge power of 4 W, we observed that the size of particulates in the outside of the bright plasma was relatively uniform, and more than 50% of particulates have diameters between 120 and 200 nm. On the other hand, the particulate density had a significant spatial distribution. The absolute particulate density ranged between 10^7 and $10^9 \mathrm{cm}^{-3}$, and it decreased monotonically with the axial distance from the bright plasma.

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