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Spatial distributions of Cu particulates in high-pressure magnetron sputtering plasmas studied by laser light scattering N. NAFARIZAL, Nagoya University, University Tun Hussein Onn Malaysia, N. TAKADA, K. SASAKI, Nagoya University, M. IKEDA, Y. SAGO, Canon ANELVA Corporation
— Ionized physical vapor deposition (IPVD) is a new technique to deposit barrier and seed layers on the surface of narrow trenches and holes. In our previous works, we have found that the ionization ratio of metal atoms in a conventional magnetron sputtering plasma increased with the discharge pressure. However, the high–pressure plasmas may have a risk of the formation of particulates. In the present work, we detected Cu particulates produced in high–pressure magnetron sputtering plasmas by laser light scattering. We observed the scattered laser light in the gas phase of the sputtering plasma when the discharge pressure was higher than 200 mTorr. Typically, particulates were concentrated at the boundary between the bright plasma and the dark region. The peak of the scattered intensity was located adjacent to the ring anode of the magnetron sputtering source. The scattered intensity varied with time after the initiation of the discharge. Since the intensity of the scattered laser light is dependent on the mean size and the density of particulates, this result indicates the temporal variations of the size and the density of particulates. In addition, it was found that the scattered intensity was very sensitive to the discharge power and the gas pressure.

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