



1. Title:	Emission Characteristics of Neutral Atoms and Ions of Laser-Produced Tin Plasma
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7. Abstract body:

The emission of neutral particles and ions from the target plasma is the crucial issue for extreme ultra-violet lithography. In the previous work, we developed the laser induced fluorescence (LIF) imaging system to visualize the temporal behavior of neutral atoms emitted from Nd:YAG laser-produced plasma(LPP). We investigated the density distributions, the time of flight information, and the energy distributions by analyzing these LIF images. The results indicated that the kinetic energy of neutral tin atoms exceeds 200 eV. In this work, we investigated the interaction between the fast ions and the collector optics using the LIF imaging system. The LIF signal from tin atoms was observed even at 300 ns after ablation just in front of the optics placed at a distance of 40 mm from the tin target. We consider that the tin atoms, which were deposited onto the optics in previous events, were sputtered by tin ions emitted from LPP. We also observed the spatial distribution of tin atoms emitted from a thin film tin target, and found that the emitted neutral tin atoms remarkably decrease for the thin film tin target. At present, we are engaged in a development of a mass-limited tin target to resolve the problems on the debris contamination.

This work was performed under the auspices of MEXT (Ministry of Education, Culture, Science and Technology, Japan) under contract subject "Leading Project for EUV lithography source development"