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Laser-produced plasma EUV source using a colloidal microjet target containing tin dioxide nanoparticles TAKESHI HIGASHIGUCHI, Utsunomiya University, NAOTO DOJYO, WATARU SASAKI, SHOICHI KUBODERA, University of Miyazaki — We realized a low-debris laser-produced plasma extreme ultraviolet (EUV) source by use of a colloidal microjet target, which contained low-concentration (6 wt%) tin-dioxide nanoparticles. An Nd:YAG laser was used to produce a plasma at the intensity on the order of 10^{11} W/cm^2. The use of low concentration nanoparticles in a microjet target with a diameter of 50 μm regulated the neutral debris emission from a target, which was monitored by a silicon witness plate placed 30 cm apart from the source in a vacuum chamber. No XPS signals of tin and/or oxygen atoms were observed on the plate after ten thousand laser exposures. The low concentration nature of the target was compensated and the conversion efficiency (CE) was improved by introducing double pulses of two Nd:YAG lasers operated at 532 and 1064 nm as a result of controlling the microplasma characteristics. The EUV CE reached its maximum of 1.2% at the delay time of approximately 100 ns with the main laser intensiy of 2×10^{11} W/cm^2. The CE value was comparable to that of a tin bulk target, which, however, produced a significant amount of neutral debris.

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