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Molecular dynamics investigation on tin M. MASNAVI, Tokyo Institute of Technology, Tokyo, Japan, H. PARCHAMY ARAGHY, M. GHORANNEVISS, Plasma Physics Research Center, I. Azad University, Tehran, Iran, M. NAKAJIMA, A. ENDO, K. HORIOKA, Tokyo Institute of Technology, Tokyo, Japan — Laser-produced tin (Sn) plasma has been considered as one of main candidates for extreme ultraviolet (EUV) light source used in EUV lithography. In order to increase conversion efficiency and to mitigate energetic ions and neutral from laser-produced Sn plasma, fundamental investigation is necessary. Theoretical study by means of hydrodynamic simulation is expected to guide us to optimize Sn target and pumping conditions. Equation of state of materials is an inevitable ingredient of all hydrodynamic simulations. However, the early stages of the laser-matter interaction process, equation of state at phase transition, for example, liquid-vapor transition, and the ejection of particles are remain unexplored. The aim of this research is to report the simulated properties of Sn over wide physical conditions by means of Materials Studio code and a 3D homemade molecular dynamics code developed for this purpose. Results have shown transient effects on the phase transitions. The simulation results are compared to experimental data obtained by pulsed laser ablation of Sn. Velocity distributions of evaporated particles from the Sn are discussed as a function of laser fluence. Also, the equation of state has been tabulated in warm dense region.

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