Abstract

Silver (Ag) plasma has been generated by employing Nd: YAG laser (532 nm, 6 ns) laser irradiation. The energy and flux of ions have been measured by using Faraday Cup (FC). The detailed Time of Flight (TOF) measurements reveal the presence of dual peak signals of fast and slow Ag plasma ions that have mostly been observed for high Z materials. As a function of laser irradiance, the energy and flux of both slow and fast ions tend to increase with increasing irradiance from 9.6 TW/cm^2 to 24.6 TW/cm^2 at all distances of FC from target surface. The distance has been varied from 5 cm to 8 cm for energy measurements and 5 cm to 8 cm and 10 cm to 13 cm for flux measurements in axial direction. As a function of Faraday cup distance, the maximum values of energies and flux of fast (445 KeV, 21.2×10^{10} cm^{-2}) and slow ions (8.8 KeV, 8.2×10^{12} cm^{-2}) have been obtained at 5 cm. These values are decreased with increasing the distance up to maximum selected values of distance. For the analysis of plume expansion dynamics, the angular distribution of ions flux measurement has also been performed at a maximum irradiance of 24.6 TW/cm^2, at four different distances of 5, 6, 7 and 8 cm. The overall analysis of both spatial and angular distributions of Ag ions revealed that the maximum flux of fast (24.6×10^{10} cm^{-2}) and slow ions (10.7×10^{12} cm^{-2}) have been observed at optimal angle of ~15°. In order to confirm the ions acceleration by ambipolar field, the Self-Generated Electric Field (SGEF) measurements have also been performed by electric probe which tend to increase by increasing laser irradiance. The maximum value of 232 V/cm has been obtained at the maximum laser irradiance of 24.6 TW/cm^2.