Comparison of sticking probabilities of metal atoms in magnetron sputtering deposition of CuZnSnS films K. SASAKI, S. KIKUCHI, Hokkaido University — In this work, we compared the sticking probabilities of Cu, Zn, and Sn atoms in magnetron sputtering deposition of CZTS films. The evaluations of the sticking probabilities were based on the temporal decays of the Cu, Zn, and Sn densities in the afterglow, which were measured by laser-induced fluorescence spectroscopy. Linear relationships were found between the discharge pressure and the lifetimes of the atom densities. According to Chantry (P. J. Chantry, J. Appl. Phys. **62**, 1141 (1987)), the sticking probability is evaluated from the extrapolated lifetime at the zero pressure, which is given by $2l_0(2-\alpha)/(\bar{v}\alpha)$ with α, l_0, and $\bar{v}$ being the sticking probability, the ratio between the volume and the surface area of the chamber, and the mean velocity, respectively. The ratio of the extrapolated lifetimes observed experimentally was $\tau_{\text{Cu}} : \tau_{\text{Sn}} : \tau_{\text{Zn}} = 1 : 1.3 : 1$. This ratio coincides well with the ratio of the reciprocals of their mean velocities $(1/\bar{v}_{\text{Cu}} : 1/\bar{v}_{\text{Sn}} : 1/\bar{v}_{\text{Zn}} = 1.00 : 1.37 : 1.01)$. Therefore, the present experimental result suggests that the sticking probabilities of Cu, Sn, and Zn are roughly the same.

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