IMPROVEMENT OF TRIBOLOGICAL PROPERTIES OF SPUTTERED MoSₓ FILMS BY VARIOUS METHODS

M. NISHIMURA, H. FUJIIURA, K. TSUKAMOTO
Hosei University, 184-8584 Koganei, Tokyo, JAPAN; e-mail: nisimura@k.hosei.ac.jp

Keywords: Molybdenum Disulfide, Sputtering, Two-target sputtering, Solid lubricant film, Ion implantation

ABSTRACT
To improve the tribological response of sputtered MoSₓ films, three methods were employed: ion implantation, two-target sputtering process and addition of carbon fluoride gas to argon during sputtering. Obtained films were evaluated in vacuum, dry air and air of high humidity by using pin-on-disk type friction testers which were operated at a sliding speed of 0.5 m/s and a load of 9.8 N.

Indium implanted films showed lowest friction coefficient of 0.008 and improvement of wear life by a factor of 5.3 comparing to that of the unimplanted one. Implantation of carbon was effective in elongating wear life in high humid air in particular. Simultaneous sputtering of MoS₂ and carbon improved wear life in vacuum as well.

Results of SEM observation and XPS analysis are presented and discussed in relation to the before mentioned results.