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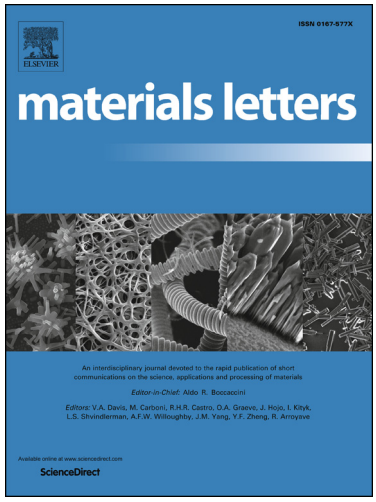

MoS_2-Sb_2O_3 film exhibiting better oxidation-resistance in atomic oxygen environment

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MoS_2-Sb_2O_3 film exhibiting better oxidation-resistance in atomic oxygen environment

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Abstract: The microstructure and wear resistance of sputtered MoS_2 films can be improved by adding some amount of metals. However, the oxidation-resistance of MoS_2-metals films would be worried because some metals are sensitive to atomic oxygen (AO). In this paper, the inert Sb_2O_3 was introduced into the MoS_2 film, and its effect on the structure and anti-oxidation ability of the MoS_2 film was clarified. XRD and SEM results revealed that due to the addition of Sb_2O_3, the growth of MoS_2 micro-platelets was almost suppressed, and so the composite film was amorphous and very compact. XPS analysis indicated that for the composite film, the influence by the AO irradiation was restricted into the film surface layer. Namely, the composite film exhibited a better anti-oxidation ability in the AO environment.

Keywords: Physical vapour deposition; Thin films; Structural; Atomic oxygen; Oxidation

1. Introduction

Sputtered MoS_2 films have been widely used as solid lubricants in space technology, but the wear resistances are limited due to the characteristic porous columnar microstructure [1]. Therefore, different metals have been introduced into the