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Nanotribology of Mo-Se-C Films

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Abstract

Transition metal dichalcogenides having layered structure are well known for their self lubricating properties. These films are considered potential substitute for carbon based films in specific environmental conditions such as in vacuum, elevated temperature etc. The macro tribological properties of these films are studied extensively and fairly well understood. However, tribological behaviour of these films in nano Newton load range has hardly been reported. Study of tribological properties at an applied load in the nano Newton range is useful for possible application related to micro electro mechanical systems (MEMS) or nano electro mechanical systems (NEMS). In view of the above, the present work is undertaken to examine surface force, friction force of Mo-Se-C film at an applied load in the range of nano Newton. The effect of carbon content, applied load and scanning speed on the friction coefficient are presented. Surfaces showing topography, lateral force, topography induced friction force and adhesion induced friction force are illustrated. The observed nanotribological behaviour of these films are analysed in the light of their nanohardness. A comparison between the nanotribological performances of these films and that of DLC are made. The results pertain to investigation at ambient condition.

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