

Thursday Afternoon Poster Sessions

Tribology Focus Topic

Room: Hall 3 - Session TR-ThP

Tribology Poster Session

TR-ThP1 XPS Study of Ti Surface Reactivity under Friction in Various Nitrogen Environments, *T. Le-Mogne, C. Mary, J.M. Martin*, Ecole Centrale de Lyon, France

Thanks to their high strength to weight ratio and good corrosion resistance, Ti alloys are widely used for various industrial applications and may be exposed to several environmental conditions. In a previous study, the authors have pointed out the evidence of titanium tribochemical reaction with nitrogen under fretting in air.

In order to investigate this phenomenon and especially the effect of friction on the nitriding mechanisms of Ti alloys, an experimental simulation was conducted in a specific Environment-Controlled Tribometer (ECT) coupled with in-situ X-ray Photo-electron Spectroscopy (XPS) analysis. Several Ti/Ti reciprocating sliding tests were performed with a pin on flat geometry successively in high vacuum, in N₂ environment and in air. The objectives were to investigate the reactivity of Ti surfaces with nitrogen in several tribological situations: after removal of native oxide layer by Ar⁺ etching, after friction under vacuum followed by N₂ exposure and after friction under N₂ environment. This approach proposes conditions needed for Titanium reaction with nitrogen.

TR-ThP2 Friction and Sliding Wear Behavior of nc-TiN/a-Si₃N₄ Nanostructured Coatings, *J. Garcia, M. Flores*, Universidad de Guadalajara, Mexico

The present work is related to the evaluation of dry sliding wear resistance of a sputtered PVD nanostructured nc-TiN/a-Si₃N₄ coating, deposited on Stainless steel 316L substrates. X-ray diffraction is used to analyze the nanostructure of the film. The topography of substrates, films and Wore Surfaces were analyzed by profilometry. Film adhesion to the substrate was evaluated by scratch-tests. The surface hardness was measured with a Vickers micro-hardness tester. The wear resistance was evaluated by Pin-on disk under a normal load in the range of 2 to 10 N and a constant tangential speed of 0.15 m/s and reciprocating apparatus with a frequency of 1 Hz and a normal load within the same range established above, both tests in dry conditions. After these tests, on the coating as well as on the counterpart, the wear mechanisms developed were analyzed by Optical Microscopy, the wear tracks were measured and the wear rate was calculated and discussed.

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