

Sliding wear characteristics of silver particles incorporated electroless nickel phosphorus composite coatings

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ABSTRACT

In the present investigation, nickel-phosphorus coatings embedded with silver particles are deposited on AISI 1018 steel substrate using an electroless deposition technique. Ni-P/Ag composite coatings were heat-treated at 400 °C for 1 h, and the influence of heat treatment on tribological properties was discussed. X-ray diffraction (XRD) analysis was conducted to confirm the presence of silver in coatings. The as-deposited (A-D) and heat-treated (H-T) coatings were subjected to wear test under room temperature and 300 °C sliding conditions. The lowest friction coefficient and wear rate was observed for the H-T Ni-P-Ag coating tested at room temperature. Scanning electron microscope (SEM) images of wear track indicate abrasive shear in (A-D) coating whereas shear observed in (H-T) coating was minimal. The energy-dispersive spectroscopy (EDS) analysis of wear tracks was carried out for the confirmation of compositional remnants on the wear track.

Keywords: Electroless Ni-P; silver particles; heat treatment; sliding wear