

Improving the Tribological and Mechanical Properties of an Aluminium Substrate by Deposition of TiCN Coatings

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The article presents an investigation of the influence of coating deposition parameters, in particular a variation with 50% of both cathodic arc current and bias voltage, on the mechanical and tribological properties of TiCN coatings on an aluminium substrate deposited by the cathodic arc evaporation of metals at a constant gas flow ratio between C₂H₂ and N₂ of 17.65 % / 82.35 %. The determined nanohardness values for the samples examined are in the range of 10 to 23 GPa. Surface morphology and chemical composition were estimated by a scanning electron microscope (SEM) and an energy dispersive spectrometer (EDS) of SEM. The tribological behaviour of the TiCN layers was examined using the “Ball-on-Disk” method (ASTM G99-95) and using a ball made of Al₂O₃ as a counter-part and a load of 10N. The friction coefficient was measured in the range of 0.182 to 0.116.

Keywords: Cathodic arc deposition, TiCN coatings, Aluminium substrate, Coefficient of friction

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