

Pulse electrodeposition and characterization of Ni-TiO₂ nano composite coatings

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Abstract: Ni-TiO₂ nano composite coatings were fabricated by using pulse current electrodeposition technique at 100 Hz pulse frequency with a constant 50% pulse duty cycles and reference was taken with respect to the direct current electrodeposition. The properties of the composite coatings were investigated by using SEM, XRD, Wear test and Vicker's microhardness test. XRD patterns of pulse deposited composite coatings were found to be changed from preferred (100) orientation to the random mixed orientations. The results demonstrated that the Vickers microhardness of composite coatings under pulse condition was significantly improved than that of pure nickel coating as well as direct current electrodeposited Ni-TiO₂ composite coatings. Wear tracks have shown the less plastic deformation at pulse condition with reduced coefficient of friction. Nickel matrix grain size was also found to be lower in pulse plated composite coatings as compared to direct current electrodeposited composite coatings.

Keywords: Pulse electrodepositon, Composite coatings, Microhardness, Wear.