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*RESEARCH PAPER*

# Tribological properties in electrodeposition of Ni-TiO<sub>2</sub> composite coating on tungsten carbide cutting tool

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## ABSTRACT

In this paper tribological and electrochemical surface properties of Tungsten Carbide cutting tool substrate coated with Ni-TiO<sub>2</sub> composite layer via electrocodeposition technique have been studied. The failure modes mechanism was observed via optical microscopy. Results from X-ray Diffractometry (XRD) analysis revealed that the peaks of XRD pattern corresponding to Ni and TiO<sub>2</sub>. During electrodeposition effect of current density, pH vale of watt's solution on microhardness of the composite layer have been studied. The grain structure of composite layer is characterized using scanning electron microscopy (SEM). Microhardness of the composite layer was investigated using Vickers microhardness tester. The surface morphology of Ni-TiO<sub>2</sub> coated layer shows the deposition of fine grained structures at low currents with higher microhardness value and better adhesiveness with substrate. Moreover at constant temperature and time of deposition, the coating thickness increases with increase in current.

**KEY WORDS** : Microhardness, Electrocodeposition, Composite layers

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