

## Multipass Scratch Characterization of TiNbVN Thin Coatings Deposited by Magnetron Sputtering

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**Abstract :** Transition metal nitrides are widely used as protective coatings on machine parts and cutting tools to protect the surfaces from abrasion and corrosion for decades. In this study, the ternary TiNbVN thin coatings were produced with closed field unbalanced magnetron sputtering system and their structural, mechanical and fatigue-like (multi-pass scratch test) properties were investigated. Two different substrates (M2 and H13 steels) were used to explore substrates effects. X-Ray diffractometer, scanning electron microscope, and energy dispersive spectroscopy were used for the structural and chemical analysis of the coatings. Nanohardness tests were proceed for mechanical properties. The fatigue-like properties of the coatings obtained from the multi-scratch test under three different cycle passes. The results showed that TiNbVN films have excellent fatigue resistance and the coatings deposited on M2 steel substrate have higher hardness and better fatigue resistance.

**Keywords :** physical vapor deposition, fatigue, metal nitride, multipass scratch test

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