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**Structural and mechanical characterization of (TiZrNbHfTa)N/WN
multilayered nitride coatings**

A.A. Bagdasaryan^{1,2*}, A.V. Pshyk², L.E. Coy², M. Kempinski^{2,3}, A.D. Pogrebnjak¹, V.M. Beresnev⁴, S. Jurga²

¹ Sumy State University, 2, Rymsky Korsakov Str., 40007 Sumy, Ukraine

² NanoBioMedical Centre, Adam Mickiewicz University, 85, Umultowska str., 61-614 Poznań, Poland 44

³ Faculty of Physics, Adam Mickiewicz University, Umultowska 85, 61-614 Poznań, Poland

⁴ Kharkiv National University, Svobody Sq., 4, 61022 Kharkiv, Ukraine

Corresponding Author: artem.a.bagdasaryan@gmail.com

Abstract

The (TiZrNbHfTa)N/WN multicomponent coatings were deposited by vacuum arc evaporation under different substrate bias (-90 and -280 V). X-ray photoelectron spectroscopy was used for analyzing of complex composition of investigated coatings by reflecting of atomic scale chemical interactions. The structural investigations showed the formation of a simple disordered solid solution in (TiZrNbHfTa)N layer, β -W₂N phase in WN layer with fcc crystal structure and highly disordered bcc (110) and (220)-oriented high-entropy alloy phases, regardless of the applied bias potential. It was shown that with increasing of substrate bias from -90 to -280 V, there is a slight decrease of hardness from 34 to 31 GPa and increase of Young's modulus from 325 to 337 GPa, which can be explained by annihilation of point defects and precipitation of relatively softer metallic phase.

Key words: multilayer structure, chemical bonding, solid solution, mechanical properties

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