

A Nanoindentation Study of Thin Film Prepared by Physical Vapor Deposition

Authors : Dhiflaoui Hafedh, Khelifi Kaouther, Ben Cheikh Larbi Ahmed

Abstract : Monolayer and multilayer coatings of CrN and AlCrN deposited on 100Cr6 (AISI 52100) substrate by PVD magnetron sputtering system. The micro structures of the coatings were characterized using atomic force microscopy (AFM). The AFM analysis revealed the presence of domes and craters which are uniformly distributed over all surfaces of the various layers. Nano indentation measurement of CrN coating showed maximum hardness (H) and modulus (E) of 14 GPa and 240 GPa, respectively. The measured H and E values of AlCrN coatings were found to be 30 GPa and 382 GPa, respectively. The improved hardness in both the coatings was attributed mainly to a reduction in crystallite size and decrease in surface roughness. The incorporation of Al into the CrN coatings has improved both hardness and Young's modulus.

Keywords : CrN, AlCrN coatings, hardness, nanoindentation

Conference Title : ICEMA 2015 : International Conference on Engineering Materials and Applications

Conference Location : Istanbul, Türkiye

Conference Dates : January 26-27, 2015