

Mechanical Behavior of PVD Single Layer and Multilayer under Indentation Tests

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Abstract : Various structures and compositions thin films were deposited on 100C6 (AISI 52100) steel substrate by PVD magnetron sputtering system. The morphological proprieties were evaluated using an atomic force microscopy (AFM). Vickers microindentation tests were performed with a Shimadzu HVM-2000 hardness testing machine. Hardness measurement was carried out using Jonsson and Hogmark model. The results show that the coatings topography was dominated by domes and craters. Mechanical behavior and failure modes under microindentation were depending of coatings structure and composition. TiAlN multilayer showed exception in the microindentation resistance compared to TiN single layer and TiAlN/TiAlN nanolayer. Piled structure provides an increase of failure resistance and a decrease in cracks propagation.

Keywords : PVD thin films, multilayer, microindentation, cracking, damage mechanisms

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