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Tribological properties of a-C:N coatings prepared by magnetron sputtering and anode layer sourceSrecko Paskvale¹, Peter Panjan¹, Miha Cekada¹, Markus Kahn², Borut Podgornik³

¹Jozef Stefan Institute, Ljubljana, Slovenia ²Joannuem Research, Laser Center Leoben, Niklasdorf, Austria ³Centre for Tribology and Technical Diagnostics, Ljubljana, Slovenia

paskvale@gmail.com

Amorphous carbon-based coatings are in widespread use as tribological applications, where a low friction coefficient is of primary importance. A combination of a hard base layer (such as TiAlN) and a solid lubricant top layer is even more applicable. A relationship between the process parameters and the achieved tribological performance is highly important for applicability of these coatings. In this work the emphasis was given on double layer TiAlN/a-C:N coatings deposited by unbalanced magnetron sputtering in the CemeCon CC800/9 deposition system. Different tool steels were used as substrates, mounted in different rotation modes: 1-fold, 2-fold and 3-fold rotation. For comparison, the same types of substrates were coated by a-C:N using the target-less anode layer source with C₂H₂ and N₂ carrier gases. The coatings were analyzed by pin on disk and 3D-profilometer to study the wear tracks. In addition, we measured the Vickers microhardness, performed the scratch test and AFM analysis of the coating surface.

Keywords

magnetron sputtering

anode layer source

a-C:N

pin on disk

tribology