

Optical Microscopy and Profile techniques like approach to study the wear mechanics on TiAlN Coatings

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Ti_xAl_{1-x}N coatings have been deposited by Magnetron sputtering at different substrate temperatures (50°C, 150°C and 200°C) to study the influence of this parameter in the tribological behavior. The friction coefficient was measured using a Ball on Disc tribometer (10cm/s and 20cm/s speed), 100Cr6 steel ball and 1N, 3N Load. The test was stopped each 1000 laps to take a wear profile and observe the worn surface with an optical microscopy to identify the wear mechanisms from mechanical point of view observing debris and wear track shape. The ball on disc test showed higher friction coefficients (0.85-1.02) but TiAlN coatings deposited at 150°C tested at 1N and 20cm/s the COF was around to 0.49. Using the micrographs and worn surface profile was possible to identify the wear process and wear mechanism like scratch and ploughing present in these coatings. The higher friction coefficient and wear rate could be explained due to mechanical properties, roughness, adhesion and micrographs of worn surface of each coating and tribology condition (load and speed).