Contribution ID: **172** Type: **Contributed**

Remote Anode Assisted Magnetron Sputtering (RAAMS) of Cr-based Hard Coatings for Tribological Applications

Tuesday 19 June 2018 14:20 (20 minutes)

In the vacuum surface engineering sector, ionized PVD and PE-CVD techniques are currently attracting a high degree of attention in producing high quality tribological surfaces with low friction, which exhibit high wear and corrosion resistance. Economical production for such high-quality surfaces is a significant driving factor for sustainable growth in coating manufacturing. In this direction, a cost-effective, commercially viable ionized PVD technology has been developed called RAAMS (Remote Anode Assisted Magnetron Sputtering) for tribological solutions.
Thick 6 μm, CrN and Cr2N coatings were deposited on hardened-high and low carbon steels with the RAAMS technology. Using this deposition method, coatings with good mechanical, tribological properties are applied to components with very high deposition rates (300 nm/min). SEM investigations of coating microstructure has shown dense, non-columnar morphology throughout the coating thickness. Importance was given to understand the influence of Remote Anode Assisted Discharge (RAAD) conditions on the microstructure, stress and mechanical properties of the coating. An energy resolved mass spectrometry study was carried out to monitor the energy and composition of Cr+ ions during the RAAMS deposition process. Time-averaged and time-resolved ion energy spectra for Ar+ and N+ was also recorded. Variation in the Cr+ to gas ion flux with respect to different RAAMS parameters were investigated. Tribological Ball-on-Disk testing conducted under initial Hertzian stress up to 650 MPa under dry sliding conditions against Al2O3 ball have shown low friction with COF between 0.2-0.3 and wear rate in the order of 10-6-10-7 mm3/N-m. Finally, the importance of commercial RAAMS technology in producing tribologically superior CrN, Cr2N coatings is briefly explained.

Primary author: Dr MYERS, Sterling (Vapor Technologies Inc)

Co-authors: Dr GOROKHOVSKY, Vladimir; Mr PETERSON, Nick; Mr ANTON, Bryce; Dr KAMATH, Ganesh (Vapor Technologies Inc)

Presenter: Dr KAMATH, Ganesh (Vapor Technologies Inc)

Session Classification: Thin Films & Surface Engineering

Track Classification: Thin Film & Surface Engineering