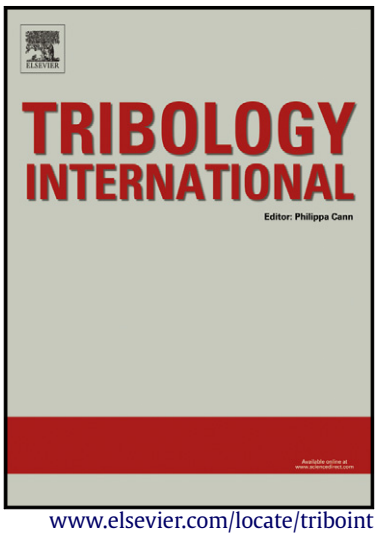

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Abstract

This paper focuses on high-temperature tribotests of nanostructured Al-Cr-based oxynitride and oxide coatings. Pin-on-disk tribological tests were performed at temperatures in between room temperature and 800°C, and the results compared to a conventional AlTiN coating. The AlCrN and AlCrON coatings showed good to acceptable wear resistance up to 600°C while at 800°C, both coating types failed. The new corundum-structured $(Al,Cr)_2O_3$ oxide showed excellent wear performance up to 800°C. Imaging and chemical analysis of the high-temperature wear tracks allowed for explaining the differences in the wear mechanisms. The ability of a coating to resist oxidation and to delay substrate oxidation, together with an excellent abrasional wear resistance, were identified as the major factors influencing wear rates under severe high-temperature conditions.

Keywords: high-temperature wear, oxynitride, oxide, rotating arc cathodes PVD coating