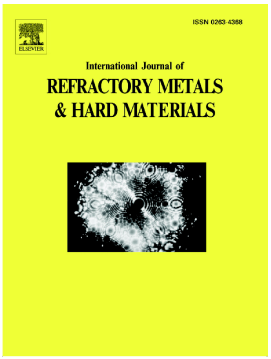


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# Sliding Wear Behavior of TiAlN and AlCrN Coatings on a Unique Cemented Carbide Substrate

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**Abstract:** PVD coating is a critical technique to improve the wear resistance and cutting performance of softer carbide substrates. The wear performance of the coating is closely related to the carbide substrate grade, coating parameters, and the coating materials. In this study, a unique carbide grade, 91WC-2TiC-3Co-3Ni-1Mo, has been developed specifically for PVD coating. Two different coatings i.e. TiAlN and AlCrN were successfully deposited with cathodic arc evaporation (CAE) technique on this carbide grade. The microstructure analysis shows good bonding between coating and carbide substrate. The comprehensive sliding wear testing, including reciprocating sliding, ball-on-disc, and micro-scratch testing, has been made to these two coatings. AlCrN coating shows consistently lower coefficient of friction (COF) compared with TiAlN coating in both reciprocating sliding test and ball-on-disc test. In addition, AlCrN coating has consistently higher normal critical loads than TiAlN coating during micro-scratch testing, demonstrating better bonding condition between coating and carbide substrate.

**Keywords:** Coating; Cemented carbides; Scratch; Hardness; Wear.

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