

Contribution submission to the conference Berlin 2012

Influence of the deposition geometry on the microstructure of sputter-deposited V-Al-C-N coatings — SUSAN DARMA¹, ●BÄRBEL KRAUSE¹, STEPHEN DOYLE¹, STEFAN MANGOLD¹, SVEN ULRICH², MICHAEL STÜBER², and TILO BAUMBACH¹ — ¹ISS, Karlsruher Institut für Technologie — ²IAM-AWP, Karlsruher Institut für Technologie

Multi-element hard coating materials such as V-Al-C-N are of great interest for many technological applications. Their mechanical properties depend on the composition and microstructure of the coating. In order to determine the optimum composition and deposition conditions of these complex materials, many samples are required. One powerful tool for reducing the number of experiments is based on the so-called combinatorial approach for thin film deposition: many different thin film samples can be realized simultaneously, exploiting the deposition gradient resulting from codeposition of several materials. We will present an X-ray diffraction study of the influence of the deposition geometry on the microstructure of V-Al-C-N coatings. The films were deposited by reactive RF magnetron sputtering from a segmented target composed of AlN and VC. Synchrotron radiation measurements were performed at the beamline PDIFF at ANKA. Significant texture changes were observed which can be attributed to the deposition geometry, as verified by calculations of the flux distribution. We conclude that codeposition can accelerate significantly the screening of new materials, under the condition that the desired property is not significantly influenced by the microstructural changes due to the deposition geometry.

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