

The aim of this study is to compare the properties of CrAlN coatings obtained by magnetron sputtering with one (CrAl) or two targets (Cr and Al). The influence of parameters such as the target bias voltage, the working pressure, the deposition time and the bias voltage applied on the Cr or Al targets on the properties of the layers was studied. We characterized the films by X-ray Diffraction, Scanning Electron Microscopy, coupled with Energy Dispersive Spectroscopy, nanoindentation and their residual stresses were also determined. The optimal films obtained with both methods are well crystallized, well-adherent to the substrate, and contained similar amounts of Al (20–30 at.%). The optimal coatings synthesized with one target presented properties not as good as those realized with two targets. Nevertheless, films made with one target showed a lower frictional coefficient probably due to composition control. The lack of compositional control with the use of one target limits the optimization process. With two targets, we have greater control over the film composition. This leads to higher hardness, lower stresses, and improved Young's modulus over films produced with a single CrAl target. Additionally, the morphologies are different (columnar with CrAl and dense with Cr and Al). To conclude, it seems more justified to work if possible with two independent targets