Use of molybdenum makes Ti-Al-N coated tools even more wear resistant.

Laboratory tests carried out at the Vienna University of Technology to develop new PVD coatings for wear protection applications prove that Mo-alloys significantly reduce wear during machining.

The service life of tools and coatings used in a wide variety of cutting processes is determined by wear phenomena such as adhesion and abrasion. Increasing the hardness is generally an effective approach to minimizing abrasive wear, but this solution only works for a specific range of applications, and has no effect on those wear mechanisms that are related to adhesion.

In order to further improve efficiency Plansee, in collaboration with Oerlikon Surface Solutions AG and the University of Technology Vienna, Institute of Materials Science and Technology, conducted a research program at one of the Christian Doppler Laboratories.

The research investigated the effect of molybdenum on the wear behavior of arc
evaporated Ti-Al-N coatings. The findings clearly showed that the in situ formation of solid, self-lubricating phases such as MoO3 led to a significant reduction in adhesive and abrasive wear. The use of targets produced by powder metallurgy (Plansee Composite Materials GmbH) allows deposition of single-phase, face-centered cubic coatings with a Mo content of up to 12 at.%. This high alloy content also had a very positive impact during wear tests up to 700 °C.

The authors Stefan A. Glatz, Vincent Moraes, Christian M. Koller and Helmut Riedl have released details of the research findings in a paper entitled “Effect of Mo on the thermal stability, oxidation resistance, and tribo-mechanical properties of arc evaporated Ti-Al-N coatings” in the Journal of Vacuum Science and Technology, published by the American Vacuum Society.

You can download the complete paper HERE.

Do you require more information about Plansee sputtering targets for hard coatings? Visit our website Plansee Composite Materials or email us at plansee-cm(at)plansee.com.