Externship: Development of wear resistant coatings using new cathodic arc sources with highly ionised plasma’s.

Msc student
Duration 6-9 Months
Starting date: June/July 2017

Company Profile

IHI Hauzer Techno Coating B.V. is a leading supplier of technology for Physical Vapour Deposition (PVD) and Plasma Assisted Chemical Vapour Deposition (PACVD) coatings and PVD and PACVD coating equipment since 1983. Hauzer is part of the IHI Group from Japan and the headquarter is located in Venlo, the Netherlands.

Problem Description

PVD (coatings have many advantages to upgrade the quality of products by improving their functional properties and lifetimes. In tools industries, PVD coatings with their high hardness and high temperature stability provide excellent wear resistance for cutting and forming tools. Today, cathodic arc deposition is the dominant technology that is used for coating cutting tools. The advantage of arc technology lies in the high degree of ionisation, high deposition rate, robust process control, long term proven industrial stability and a large variety of provided coatings and parts.

Disadvantage of arc deposition technology is the existence of droplets (macro particles) in the coating that have a negative influence on the performance of the coatings. The range of materials that can be deposited is limited to metallic or conductive ceramic coatings such as nitrides and carbonitrides. it is impossible to deposit oxide coatings due to their insulating nature. Recently new technologies have been developed to overcome these problems.

Project Goals

- Scanning process parameter field of the new arc technology for depositing transition metal nitride coatings (TiAlN and/or AlCrN) using Design of Experiments (DOE) methods.
- Performing coating runs in Industrial PVD coating Equipment.
- Characterizing the coatings deposited with highly ionised plasma’s in comparison with DC-ARC deposited coating, including:
  - Microstructure and composition
  - Micro hardness
  - Thickness
  - Roughness/droplet density
  - Adhesion
- Comparison of the newly developed coating with benchmark coating in machining tests.

Contact Information

If you are interested in this project please contact us for further information.

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