

RESEARCH PROJECT

Anode Plasma Ionized Magnetron Sputtering (APiMS)

An efficient PVD sputtering process is being investigated and developed in the Invest BW project APiMS, which should lead to a reduction in coating time and thus to electricity and CO₂ savings.

PVD (Physical Vapor Deposition) processes are among the most economical, environmentally friendly surface coating technologies. Although PVD is a proven technology, opportunities for further technological improvements are constantly being discovered. The project idea described in this research project combines recently discovered possibilities of additional plasma generation at an anode with the PVD process of cathode sputtering (also known as magnetron sputtering) for technological applications. This achieves a significantly higher ionization of both the working gas and the sputtered material. This leads to a more efficient flow of the sputtered species to the component to be coated, to better coating properties and thus to a significant reduction in coating time. The ecological benefits of this technological improvement lead to a significant reduction in electricity consumption and thus to CO₂ savings.

The efficiency of the process will be increased by implementing an active anode, with the possibility of additionally igniting a plasma there. The operation of this anode and the additional ignition of a plasma at the anode leads to a significant ionization of the gas atmosphere and the sputtered species coming from the target. This new technique is therefore called “Anode Plasma Ionized Magnetron Sputtering” (APiMS).

The higher ionization in the vacuum chamber will lead to an increase in coating adhesion and coating hardness. This improves the mechanical properties of the coating and thus the service life of coated tools or the wear properties of coated components.

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