

## Applied Research Activities

### Self-Lubricating CrAIN+XS Coatings Deposited by Pulsed Arc PVD (TRISTAN, IGF 16/13 – AiF-No. 20431 N)

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Cathodic arc physical vapor deposition (arc PVD) is a widely used technology for tribological and decorative coatings. The implementation of pulsed power supplies offers various benefits, such as reduced surface roughness and increased coating hardness. The TRISTAN project presents the use of pulsed power supplies on an industrial arc PVD system, demonstrating the advantages of the technology for the production of CrAIN coatings. Furthermore, the incorporation of electrically low conductive MoS<sub>2</sub> and WS<sub>2</sub> containing targets for CrAIN+XS deposition was investigated using pulsed arc PVD technology. Coatings were analyzed for their basic properties with regard to the incorporation of triboactive elements Mo, W, and S into the CrAIN matrix. Tribological investigations were conducted under dry running conditions using a pin-on-disk tribometer, and the tribofilms on the coated parts were examined by Raman spectroscopy. The results indicate that pulsed arc PVD can decrease droplet emission and surface roughness, leading to lower wear and friction coefficients for CrAIN+XS coatings compared to uncoated steel references. Moreover, the CrAIN+MoS coating showed the ability to form the solid lubricant MoS<sub>2</sub> under tribological load. This project presents a significant contribution to the field of tribology and demonstrates the potential of pulsed arc PVD technology for coating deposition with low surface roughness and evaporation of low conductive target materials.

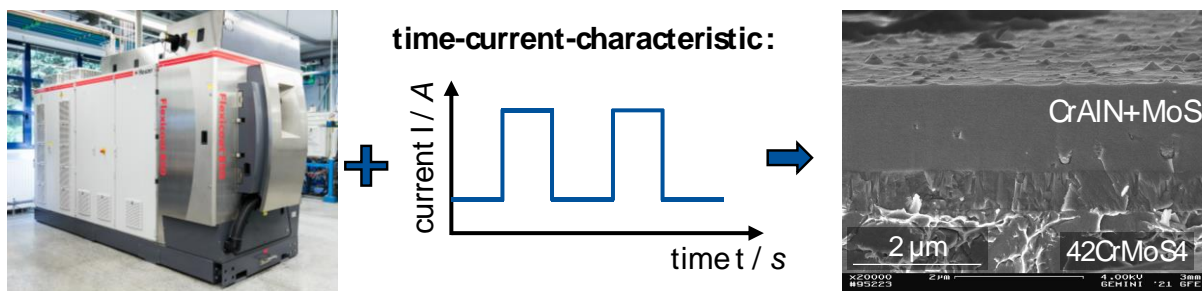


Figure 1: CrAIN+MoS deposited with pulsed Arc PVD