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Structure, tribological behaviour and photocatalytic activity of ARC-PVD TiO₂ coatings obtained with a modified curvilinear magnetic filter

ABSTRACT. TiO₂ coatings on AISI 430 stainless steel were produced by the vacuum-arc deposition technique with the application of a modified curvilinear magnetic filter, which allowed enhanced deposition rates up to 50 μm/h with a decrease of the quantity of macroparticles. The structure and chemical and phase compositions of the coatings were investigated by SEM together with EDX, XRF and XRD analysis. According to X-ray diffraction, the formation of single-phase TiO₂ took place. Mechanical and tribological properties were determined. The average hardness of the coatings was 13.8 GPa and the Young's modulus was 211 GPa. Dry friction wear tests revealed high resistance of the coating to wear and a low friction coefficient under a load of 50 N. There was a significant decrease of *E. coli* colonies during 20 min UV exposure on samples with the coating, demonstrating photocatalytic bactericidal activity.

Keywords: chemical composition, coating, mechanical properties, morphology, photocatalytic activity, structure, TiO₂

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