

## **Corrosion and wear resistance of ZrN/N coated Co-Cr-Mo dental cast alloy**

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In the last decades, TiN based thin films have been widely used in different technological areas, because of their high hardness, wear and corrosion resistance together with shiny and golden appearance. More recently, ZrN started to attract attention as an effective biomedical coating material. In the present study, ZrN/Ti bilayer film was deposited on a high frequency induction casted Co-Cr-Mo dental alloy by reactive radio frequency magnetron sputtering, using different ratios of Ar/N<sub>2</sub>. Phase structure and elemental composition of the coating was determined by XRD and EDS. The surface morphology of the coatings obtained under different experimental conditions of nitrogen flow rate was characterized by SEM and AFM. Scratch tests under standard conditions were undertaken to determine the coating adhesion and the damage mechanism. Wear tests were performed using a CSEM tribometer (pin-on-disc) with a 6mm ruby ball under an applied load of 0.5 N and the wear track analysis was performed using SEM. Electrochemical potentiodynamic polarization and impedance spectroscopy was used to study the corrosion resistance of the coated alloys in 0.9 wt.% NaCl solution at 36.5°C. The results of the study showed that the ZrN/N coating on Co-Cr-Mo cast alloy obtained under optimized Ar/N<sub>2</sub> ratio exhibited improved wear and corrosion resistance than the TiN and ZrN coatings.