

# Coatings used in prosthetic dentistry for ceramics adherence enhance

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**Keywords:** thin films; oxynitrides; interfaces; bond strength; dental restorations.

## **Abstract.**

A good bonding between NiCr or CoCr alloys and the ceramic layer is crucial for the success of all dental restorations. In clinical practice, many restorations are removed due to the ceramic fracture. The aim of this work is to improve the bond strength between metal and dental ceramics in prosthetic restorations by addition of TiSiON coatings as interlayers between these two. The coatings were deposited on NiCr and CoCr dental alloys by using the cathodic arc method at various substrate bias voltage values (from -100V to -200V). The elemental composition, crystalline structure, mechanical properties, surface roughness, contact angle and corrosion resistance of the coatings were investigated. The bond strength of the metal–ceramic system, with and without TiSiON interlayers, was evaluated by using a three-point bending test.

The coatings prepared at -100 V and -150 V exhibited the maximum hardness (32 GPa). All of the coatings had a superior corrosion resistance in artificial saliva (pH = 5.2) than both uncoated alloys, independent on the deposition parameters. The best corrosion performance was found for coatings prepared at -100 V and -150 V. The bending test showed that the addition of a TiSiON layer between CoCr or NiCr alloy and ceramic, enhance the adherence of the ceramic on both alloys. By increasing bias voltage, the bond strength increased.

## **Acknowledgement:**

This work was supported by Partnerships in priority areas program - PN II, developed with support from ANCS, CNDI—UEFISCDI, project no. 175/2012 (Coat4Dent).