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### **Nanostructured ZrO<sub>2</sub> ceramic PVD coatings on Nd-Fe-B permanent magnets**

**ABSTRACT.** The results of vacuum-arc deposition (PVD) of thin ZrO<sub>2</sub> coatings to protect the surface of Nd-Fe-B permanent magnets used as repelling devices in orthodontics are presented. Magnetic devices are offered as an optimum and biologically safe force-generating system for orthodontic tooth movement. The structure, phase composition and mechanical properties of zirconium oxide films have been investigated by means of SEM, XRD, EDX, XRF and nanoindentation methods. The coatings are formed of polycrystalline ZrO<sub>2</sub> films of monoclinic modification with average grain size 25 nm. The influence of the ZrO<sub>2</sub> coating in terms of its barrier properties for corrosion in quasiphysiological 0.9% NaCl solution has been studied. Electrochemical measurements indicated good barrier properties of the coating on specimens in the physiological solution environment.

**Keywords:** coating, corrosion, structure, vacuum-arc deposition, zirconium dioxide

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