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Surface peformances of PVD ZrN coatings in biological environments

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Abstract: Zirconium nitride (ZrN) thin films were deposited by reactive RF magnetron sputtering on Ti-6Al-4V and Si (100) substrates for potential use in biomedical applications. The tribological behaviour was evaluated against bovine bone in dry condition using a pin-on-disc apparatus. Abrasion is the primary wear mechanism observed in ZrN/bone contact. The corrosion properties were determined through two electrochemical techniques: potentiodynamic polarization and electrochemical impedance spectroscopy. The coatings with reduced oxygen content provided: (i) good resistance against corrosion when exposed to physiological solution and (ii) better anti-bioadhesion against Staphylococcus aureus bacteria.

Keywords : PVD coating, ZrN, wear, corrosion, bioadhesion