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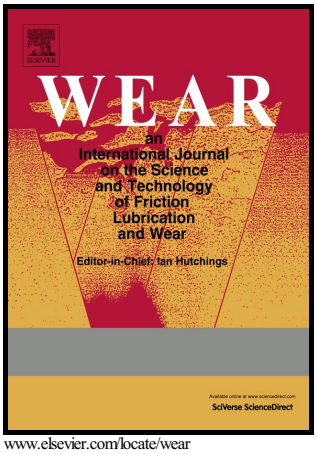


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# Fretting corrosion between bone and calcium phosphate-calcium titanate coatings

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**Abstract**

Biocompatibility is one of the biggest challenges for biomaterials development. This issue arises in the case of coatings. Calcium phosphate (CP) coatings are currently used to cover femoral stem implants, while calcium titanate (CT) has also been proposed as a coating for biomedical applications due to its good biocompatibility and osteoconductivity. However, its behavior under fretting corrosion conditions, one of the degradation mechanisms of hip joint implants, has not been studied. In this work, tribocorrosion behavior of calcium phosphate - calcium titanate coatings obtained by Radio Frequency (RF) magnetron sputtering onto AISI 304 stainless steel was evaluated. The coatings were deposited in 100%CP-0%CT, 75%CP-25%CT, 50%CP-50%CT, 25%CP-75%CT and 0%CP-100%CT volume proportions. An electrochemical cell integrated with a ball-on-flat reciprocating tribometer was used to investigate the performance of the coatings under fretting conditions against bone in Hank´s solution at 37 °C. The suitability of three specific coating compositions for the protection of AISI 304 stainless steel, based on their hardness, non-conductive nature and absence of a passive layer, was demonstrated by open circuit potential measurements. It was concluded that 75CP-25CT and 0CP-100CT coatings are potential materials for bone tissue replacement and regeneration.