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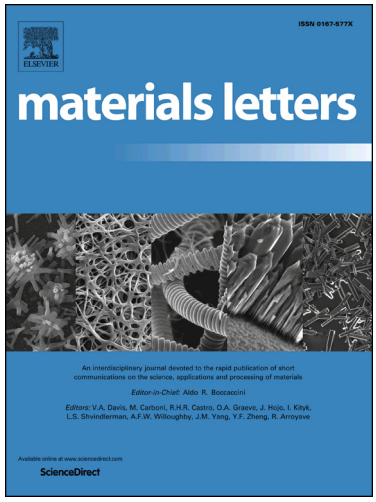


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# Preliminary investigation on the tribocorrosion behaviour of nanotubular structured Ti6Al4V surfaces

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## Abstract

In order to improve its tribocorrosion resistance, nanotubular structures were produced on Ti6Al4V surfaces by anodic treatment in a mixture of 1 M $H_2SO_4$ and 0.08 M HF electrolyte. Tribocorrosion tests were performed in a phosphate-buffered saline solution (PBS) against an alumina ball under 50 mN. Results showed that nanostructured surfaces exhibited significantly lower tendency to corrosion due to the protecting effect given by the well-adherent $TiO_2$ nanotubular layer.

**Keywords:** Nanotubular structures; Ti6Al4V; Tribocorrosion.

## 1. Introduction

Ti6Al4V alloy is one of the most popular material for the femoral stem in hip joint prostheses due to its high corrosion resistance, biocompatibility, and adequate mechanical properties. However, its poor wear resistance raises major clinical concerns as combined action of corrosion and wear (i.e. tribocorrosion) leading to the release of wear debris and metallic ions [1].

Recently, nanostructured Ti surfaces gained an intensive attention in order to improve biocompatibility, wear resistance, and osseointegration properties [2–4]. Within several available techniques, anodic treatment (AT) is a reliable, economic, and