

## Accepted Manuscript

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PII: S0261-3069(14)00839-5

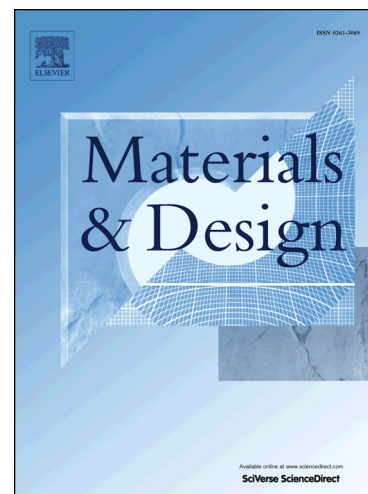
DOI: <http://dx.doi.org/10.1016/j.matdes.2014.10.051>

Reference: JMAD 6910

To appear in: *Materials and Design*

Received Date: 6 August 2014

Accepted Date: 17 October 2014



Please cite this article as: Saravanan, I., Elaya Perumal, A., Vettivel, S.C., Selvakumar, N., Baradeswaran, A., Optimizing wear behaviour of TiN coated SS 316L against Ti alloy using response surface methodology, *Materials and Design* (2014), doi: <http://dx.doi.org/10.1016/j.matdes.2014.10.051>

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## Optimizing wear behaviour of TiN coated SS 316L against Ti alloy using response surface methodology

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### Abstract

Titanium Nitride (TiN) is a hard ceramic biocompatible material, which is deposited over Stainless Steel (SS) 316L to improve the mechanical and wear properties when sliding against Ti-6Al-4V alloy for artificial hip joints. Arc deposited TiN coating thickness was measured, using an Optical Microscope. The surface hardness of the TiN coated surface has been improved 9 times more than that of the uncoated steel surface. The crystallography of the coated surface was examined by the X-ray Diffraction analysis, and the topography of the coated surface was inspected, using the Atomic Force Microscope. The wear test was conducted, using the ball-on-disc, with the varying parameters of the applied load (2 -6N), sliding velocity (0.25 -0.75 m/s) and Sliding distance (500 -1500 m). The Worn surface of the coated and uncoated sample was studied, using the Field Emission Scanning Electron Microscope. It was concluded that the presence of TiN coating on the SS 316L surface exhibits superior wear resistance and coefficient of friction. The optimum parameters of wear and friction were identified, using Response Surface Methodology, and some useful conclusions were made.

**Keywords:** *Hardness, wear, coefficient of friction, Response surface methodology, Cathodic arc deposition.*

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