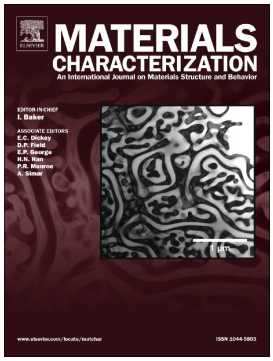
Accepted Manuscript



Influence of bias voltage on structure and tribocorrosion properties of TiSiCN coating in artificial seawater

Yue Wang, Jinlong Li, Chaoqun Dang, Yongxin Wang, Yuejin Zhu

PII: S1044-5803(17)30701-5
DOI: doi: 10.1016/j.matchar.2017.03.012
Reference: MTL 8592

To appear in: *Materials Characterization*

Received date: 13 August 2016
Revised date: 26 December 2016
Accepted date: 7 March 2017

Please cite this article as: Yue Wang, Jinlong Li, Chaoqun Dang, Yongxin Wang, Yuejin Zhu , Influence of bias voltage on structure and tribocorrosion properties of TiSiCN coating in artificial seawater. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Mtl(2017), doi: 10.1016/j.matchar.2017.03.012

Influence of bias voltage on structure and tribocorrosion properties of TiSiCN coating in artificial seawater

Yue Wang [a, b], Jinlong Li [a*], Chaoqun Dang [a], Yongxin Wang [a], Yuejin Zhu [b]

[a] Key Laboratory of Marine Materials and Related Technologies, Zhejiang Key Laboratory of Marine Materials and Protective Technologies, Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences, Ningbo 315201, PR China

[b] Faculty of Science, Ningbo University, Ningbo 315211, PR China

Abstract

The TiSiCN coatings deposited at different bias voltages were fabricated on Ti6Al4V alloy by arc ion plating. The structure and properties of the TiSiCN coating were characterized using scanning electron microscope, X-ray diffraction, X-ray photoelectron spectroscopy, transmission electron microscopy, nanoindentation, potentiostat and ball-on-plate wear tests. As the bias voltage increases, the TiSiCN coating shows a nanocystallite/amorphous structure, whereas the phase constitution and grain size changed slightly, and its hardness and tribocorrsoion properties also change correspondingly. When the bias voltage is -100 V, the coating has a composite structure of typical nanocystallite/amorphous, and a small amount of MAX phase of Ti_3SiC_2. Moreover, the protection potential applied on the coating effectively prevent the electrochemical corrosion of the coating. However, the applied protection potential will accelerate the degradation of the coating when the channel formed between the surface of the wear track and substrate.

* Corresponding author.

E-mail address: lijl@nimte.ac.cn (J.Li).