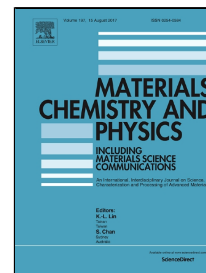


Accepted Manuscript

Effects of CH₄ flow ratio on the structure and properties of reactively sputtered (CrNbSiTiZr)C_x coatings



Yu-Siang Jhong, Chih-Wei Huang, Su-Jien Lin

PII: S0254-0584(17)30611-9

DOI: 10.1016/j.matchemphys.2017.08.002

Reference: MAC 19899

To appear in: *Materials Chemistry and Physics*

Received Date: 10 May 2017

Revised Date: 29 July 2017

Accepted Date: 02 August 2017

Please cite this article as: Yu-Siang Jhong, Chih-Wei Huang, Su-Jien Lin, Effects of CH₄ flow ratio on the structure and properties of reactively sputtered (CrNbSiTiZr)C_x coatings, *Materials Chemistry and Physics* (2017), doi: 10.1016/j.matchemphys.2017.08.002

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Effects of CH₄ flow ratio on the structure and properties of reactively sputtered (CrNbSiTiZr)C_x coatings

Yu-Siang Jhong, Chih-Wei Huang and Su-Jien Lin*

*Department of Materials Science and Engineering, National Tsing Hua University,
Hsinchu 300, Taiwan*

* Corresponding author: Tel.: +886-3-5742620, E-mail: sjlin@mx.nthu.edu.tw

Abstract

High-entropy (CrNbSiTiZr)C_x coatings were successfully fabricated by reactive radio-frequency magnetron sputtering using an equimolar CrNbSiTiZr alloy target under CH₄-containing Ar flow. The effect of the CH₄ flow ratio on the chemical composition, microstructure, mechanical and tribological properties of (CrNbSiTiZr)C_x coatings was investigated. The carbon content in the coatings varied from 36.7 at% to 87.8 at% with an increasing CH₄ flow ratio from 3% to 20%. The (CrNbSiTiZr)C_x coatings revealed a simple NaCl-type FCC (face-centered cubic) structure. The maximum hardness of 32 GPa was obtained at the carbon content of 36.7 at% by applying substrate bias of -100 V. On the other hand, the coating with high carbon content of 87.8 at% possessed superior wear resistance, which friction coefficient and wear rate were, respectively, 0.07 and 2.0×10^{-7} mm³/N·m.

Keywords: Physical vapor deposition; High-entropy alloys; Coatings; Mechanical Property; Wear.

Download English Version:

<https://daneshyari.com/en/article/7922015>

Download Persian Version:

<https://daneshyari.com/article/7922015>

[Daneshyari.com](https://daneshyari.com)