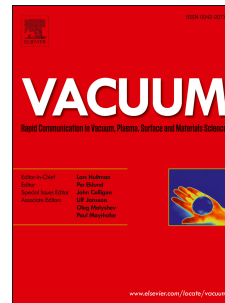


Accepted Manuscript

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PII: S0042-207X(17)31253-8

DOI: [10.1016/j.vacuum.2017.11.020](https://doi.org/10.1016/j.vacuum.2017.11.020)

Reference: VAC 7689

To appear in: *Vacuum*

Received Date: 12 September 2017

Revised Date: 9 November 2017

Accepted Date: 10 November 2017

Please cite this article as: Innocent AJ, Hlatshwayo TT, Njoroge EG, Malherbe JB, Interface interaction of tungsten film deposited on glassy carbon under vacuum annealing, *Vacuum* (2017), doi: 10.1016/j.vacuum.2017.11.020.

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Interface interaction of tungsten film deposited on glassy carbon under vacuum annealing

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Abstract

Thin films of tungsten (W) were deposited on glassy carbon substrates using magnetron sputtering system. The as-deposited samples were annealed under vacuum at temperatures ranging from 600 to 1000 °C for 1 hr. The interface interaction of W and glassy carbon was investigated by Rutherford backscattering spectroscopy (RBS) and scanning electron microscopy (SEM). RUMP software was used to simulate the RBS spectra. The thickness of W thin film deposited, atomic composition of deposited layer and the reaction zone (RZ) were deduced from the RUMP simulation results. The surface morphology of the diffusion couples were examined using SEM. The as-deposited sample possessed a smooth uniform layer of W film while the annealed samples showed a progressive increase in surface roughness with increased annealing temperature. The stability of W-glassy carbon diffusion couple under heat treatments suggests that it might be useful for long-term structural integrity of dry cask storage devices and in general applications where a radiation shield is required

Keywords: glassy carbon, tungsten, interaction, RBS, SEM

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