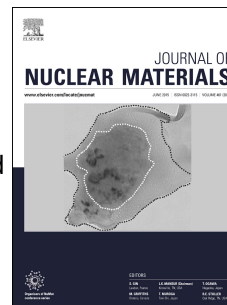


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Evolution behavior of helium bubbles and thermal desorption study in helium-charged tungsten film

Le Wang^{1,2}, Ting Hao^{1,*}, Bang-Lei Zhao^{1,2}, Tao Zhang¹, Qian-Feng Fang¹,
Chang-Song Liu, Xian-Ping Wang^{1,*}, Lei Cao³

¹ Key Laboratory of Materials Physics, Institute of Solid State Physics, Chinese Academy of Sciences, Hefei 230031, China

² University of Science and Technology of China, Hefei 230026, China

³ Institute of Plasma Physics, Chinese Academy of Sciences (ASIPP), P.O. Box 1126, Hefei 230031, China

* Corresponding authors, T. Hao: hao.ting@issp.ac.cn; X. P. Wang: xpwang@issp.ac.cn
Telephone: +86/0551/65591727; Fax: +86/0551/65591434

Abstract:

In order to investigate the evolution behavior of the formation and growth of He bubble, helium-charged W films have been prepared by radio frequency (RF) magnetron sputtering in a mixed atmosphere of He and Ar as well as the annealing were performed at different temperatures at 500 °C, 700 °C and 1000 °C for 2h, respectively. Microstructure of the films before/after the annealing were characterized by using X-ray diffraction (XRD), scanning electron microscopy (SEM) and transmission electron microscopy (TEM). There are a number of He bubbles in the films both before and after the annealing. The bubble size increases with increasing the annealing temperature but the bubble sizes in all samples are less than 3 nm. Nanohardness demonstrates a decrease tendency with increasing the annealing temperature. There are four He desorption peaks in thermal desorption spectroscopy (TDS) spectra within the range of 1000 °C for the as-deposited film, while they disappear completely or shift toward high temperature for the samples annealed at

* Corresponding authors at: Institute of Solid State Physics, Chinese Academy of Sciences, China.
E-mail addresses: hao.ting@issp.ac.cn (T. Hao), xpwang@issp.ac.cn (X. P. Wang).

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