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Abstract

Bulk nanolayered Cu/V composites simultaneously exhibit high strength and outstanding thermal stability due to its unusually high density of interfaces. However, investigation of the irradiation stability of this material is still in its infancy, limiting further application of these materials under radiation conditions. Herein we investigated the radiation response of bulk nanolayered Cu/V composites exposed to 200 keV He ions with two irradiation fluences of 2×10^{21} ions/m^2 and 7×10^{22} ions/m^2. It is demonstrated that the bulk Cu/V nanolayered composites remained stable with respect to mechanical property and microstructure after irradiation with fluence of 2×10^{21} ions/m^2. In contrast, for materials exposed to high irradiation fluence of 7×10^{22} ions/m^2, severe irradiation damage, such as obvious surface blistering, elongated He voids, and layer morphological instability, were developed. In addition, asymmetric He bubbles distribution and obvious He bubble-free zones were observed near the Cu/V interfaces and within layers. The mechanisms of radiation-induced instabilities

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