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Molecular Dynamics Investigation of H/He Behaviors in W XIAO-CHUN LI, GUANG-NAN LUO, Institute of Plasma Physics, Chinese Academy of Sciences, China — Tungsten (W) and W alloys are regarded as the most promising candidates for PFM s because of their good thermal properties, such as high melting temperature and low sputtering erosion, which will be widely used in the next generation of fusion reactors. However, blistering in W-PFM induced by extremely high fluxes of low-energy hydrogen (H) and helium (He) ions irradiation will seriously influences the plasma stability and limits the lifetime of PFM. Based on the W-H-He potential developed by ourselves, we systematically investigate the interaction between H/He and different kinds of defects in W using MD calculations. We have demonstrated the physical origin of H-H repulsion and He-He attraction in W, and given the binding energy dependence of H/He, vacancy and self-interstitial atom to the H/He-vacancy cluster on H/He-vacancy ratio. The formation and growing process of H-vacancy clusters and He-vacancy clusters have been demonstrated, respectively. However, higher H concentration is needed to form the H-vacancy clusters, while the He-vacancy clusters tend to form spontaneously.

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