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# Study on helium-induced hardening due to interaction between helium bubbles and edge dislocation by molecular dynamics simulation

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Neutron irradiation-induced defects will degrade the mechanical properties of future fusion reactor structural materials. The understanding of the mechanisms for the interaction between gliding edge dislocation and irradiation-induced defects, such as voids and helium bubbles, is of vital importance. In this presentations, the interaction between an edge dislocation and helium bubbles with different sizes and he contents in bcc-Fe was investigated by using molecular dynamics simulation. Effect of temperature also have been considered in the simulation. The results indicate that the helium-induced hardening strength increases with increasing the size of helium bubble and decrease with increasing system temperature, respectively. The release stress of dislocation weakly depends on He/V ratio at the relatively low ratios, whereas a further increase of the He/V ratio leads to loop-punching from over-pressurized helium bubble. Thus the interaction mechanism was obviously changed at high He/V ratios.

## Eligible for student paper award?

Yes

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