

Effects of Hydrogen-Ion Irritation on the Microstructure and Hardness of Fe-0.2wt.%V Alloy

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Abstract : Microstructural and hardening changes of Fe-0.2wt.%V alloy and pure Fe irradiated with 100 keV hydrogen ions at room temperature were investigated. It was found that dislocation density varies dramatically after irradiation, ranging from dislocation free to dense areas with tangled and complex dislocation configuration. As the irradiated Fe-0.2wt.%V samples were annealed at 773 K, the irradiation-induced dislocation loops disappear, while many small precipitates with enriched C distribute in the matrix. Some large precipitates with enriched V were also observed. The hardness of Fe-0.2wt.%V alloy and pure Fe increases after irradiation, which ascribes to the formation of dislocation loops in the irradiated specimens. Compared with pure Fe, the size of the irradiation-introduced dislocation loops in Fe-0.2wt.%V alloy decreases and the density increases, the change of the hardness also decreases.

Keywords : irradiation, Fe-0.2wt.%V alloy, microstructures, hardness

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