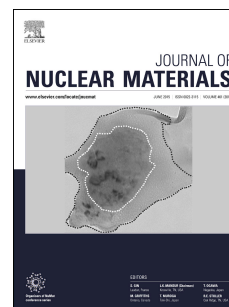


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## He behavior in Ni and Ni-based equiatomic solid solution alloy

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### Abstract

In the current work, pure nickel (99.99 wt.%) and Ni-containing single phase equiatomic solid solution alloy Fe-Co-Cr-Ni were irradiated with 190 keV He ions at room temperature with different fluences and He behavior in both materials are compared. At  $1 \times 10^{17} \text{ cm}^{-2}$ , TEM observation reveals that only isolated and small He bubbles (1-2 nm) are formed in Fe-Co-Cr-Ni alloy while many small suspected “string”-like He bubbles are observed in nickel at the concentration peak region (5.5 at.%). When the fluence is increased to  $5 \times 10^{17} \text{ cm}^{-2}$ , average bubble size in nickel increases to ~8 nm which is almost equal to that in Fe-Co-Cr-Ni, but a higher bubble density is observed in nickel. At the highest dose of  $1 \times 10^{18} \text{ cm}^{-2}$ , numerous surface blisters and exfoliations occur in nickel which are consistent with TEM observation, while the Fe-Co-Cr-Ni alloy only shows a slight surface blister. Bubble coarsening upon annealing at 500° C (2 hours) is observed at  $5 \times 10^{17} \text{ cm}^{-2}$  in both alloys, but a

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