

Hydrogen Interaction with Nickel Containing Radiogenic ^3He

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The work is devoted to comparative study of hydrogen interactions with pure Ni and Ni containing ^3He . “Tritium trick” technique was used for a build-up of radiogenic helium inside Ni samples.

The main results can be summarized as follows:

- The structure of Ni samples is being changed after its exposure to tritium at high pressure and temperature and subsequent aging at room temperature both as a result of tritium supersaturation and the presence of ^3He ;
- Release of radiogenic helium from Ni occurs at $T > 1500\text{K}$, which is much higher than the temperature of release of helium implanted in Ni samples by ion bombardment;
- Even the presence of 6 appm ^3He results in a profound change of Ni properties: i) degradation of mechanical properties; ii) appearance of the open porosity, which changes kinetics of hydrogen sorption-desorption processes.

Advantages and disadvantages of two variants of the "tritium trick" technique for studying helium effects on metal properties will be discussed:

- i) a long-term exposure in tritium at elevated temperature up to the build-up of a predetermined ^3He concentration;
- ii) saturation of metal up to high equilibrium concentration, rapid cooling to room temperature and ageing at room temperature.

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