



Abstract

The characteristics for the hydrogen storage was investigated using depleted uranium that was the waste of nuclear fuel manufacturing. Activation process was conducted to heat the experimental vessel to 450 under vacuum and the reaction temperature was room temperature. The absorption reaction between hydrogen and depleted uranium was very fast with rapid increasing of temperature and reached to the saturated state within 10 minutes. The ratio of hydrogen to uranium was 2.95 and the amounts of absorbed hydrogen were 3.5 liter after one hour of reaction. The experimental results of reproducibility showed the similar tendencies after third reaction. The reaction of hydrogen and deuterium showed similar tendencies and the initial reaction rate of deuterium was slower than that of hydrogen. The desorption of absorbed hydrogen started around 250 . It was confirmed that the almost absorbed

hydrogen was desorbed by heating to 450 .

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(depleted uranium) 25g . , 99.74wt% , mass spectrometer , $U^{235}=0.201 \text{ wt\%}, U^{236}=0.004 \text{ wt\%}, U^{238}=99.794 \text{ wt\%}$. hydriding Fig.1 stainless steel 1x10⁻⁶ Torr • • rotary pump TMP(turbo molecular pump) , weleded bellows-sealed valve . baratron gauge (0-1,000 Torr) reference • volume 510cc 가 , 10liter 가 manifold volume 189cc . .



Fig. 1. Experimental apparatus for the metal-hydriding reaction





Fig.2. Reaction vessel for the metal-hydriding reaction







Fig.3. Activation of depleted uranium

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Fig.4. Loading hydrogen to uranium vessel





Fig.5. Reproducibility of uranium-hydrogen reaction



Fig. 6. Absorption of hydrogen and deuterium to uranium





Fig. 7. Desorption of hydrogen from uranium with evacuation



Fig.8. Desorption of hydrogen from uranium



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