The radial delayed hydride cracking behavior of Zr-2.5Nb alloy pressure tube at different temperatures

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Abstract Cantilever beam samples with V-notches were employed to measure the radial delayed hydride cracking rate (DHCR) in Zr-2.5Nb alloy pressure tubes within the temperature range from 120 ℃ to 250 ℃ in this study. Both initiation and propagation of DHC were monitored using DCPD technique. The results show that radial DHCR and temperature fit the Arrhenius relationship within the temperature as mentioned above range, yielding a crack propagation activation energy of 38.66 kJ/mol. It was observed that the incubation periods for radial DHC initiation typically shortened with rising temperature from 180 ℃ to 250 ℃, and the anisotropy of DHCR is also discussed in this study. Besides, the presence of undissolved circumferential hydrides appears to affect radial DHC behavior.

Keywords Zr-2.5Nb alloy, pressure tube, radial delayed hydrides cracking

Reference

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