Zr 500 Engine Specs

The reaction of He with the epsilon phase of the 50 wt. % U--Zr alloy is studied using a sensitive vacuum microbalance apparatus to prepare the alloys, a sensitive McLeod gage to measure the dissociation pressures, and x-ray diffraction analyses to determine the phases present in the alloy. Although the reaction of H/sub 2/ with the alloy is very rapid at 100 deg C for oxide free surfaces, homogenization is very slow. Hydrogen alloys are prepared in the composition range of U/sub 0.28/Zr/sub 0.72/H/sub 0.0007/to U/sub 0.28/Zr/sub 0. 72/H/sub 0.121/ and the dissociation pressure measurements determined in the temperature range of 300 to 600 deg C. Due to the slow processes of homogenization, the hydride ZrH/sub 1.2/ is not readily precipitated below 400 deg C. On heating to 525 deg C and cooling, the hydride is readily formed for compositions of U/sub 0.28/Zr/sub0.72/H/sub 0.035/ and higher. For lower H/sub 2/ compositions, the hydride is not found in the x-ray diffraction patterns on heating these compositions to 525 deg C and cooling. It is suggested that small hydride nuclei are formed which are not observable by x-ray diffraction methods. Due to a slow rate of metallic diffusion, these nuclei cannot grow. The solubility of H/sub 2/ in the alloy is determined to be approximately 0.02 at.% at 500 deg C. This is a smaller value than that found for pure Zr. However, the heat of solution of hydride is +8,900 plus or minus 1,000 calories per gram atom and compares with a value of +8,600 calories per gram atom found for Zr. A transformation of the epsilon to gamma phase of the alloy is found near 550 deg C. (auth).

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Proceedings of the USAEC Symposium on Zirconium Alloy Development, Castlewood, Pleasanton, California, November 12-14, 1962Popular Science
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temperature corrosion resistance is a standard reference for all those studying and dealing with high-temperature corrosion. Summarises a wide range of research on ways of dealing with high-temperature corrosion Discusses ways of modelling high-temperature corrosion processes to improve material performance and service life A standard reference for all those studying and dealing with high-temperature corrosion

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