인공열화 된 CF8A 강의 부식피로 특성 평가

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Evaluation of Corrosion Fatigue Characteristics of Artificially Aged CF8A Steel

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Key Words: Corrosion(부식), Corrosion Fatigue(부식 피로), DCPD method(직류전위차법)

Abstract : Even though nuclear power showed remarkable increase as an industrial energy source, recently, its demand has been slowed down by conservatism of nuclear power industry and market stagnation. Therefore, many researchers have so far investigated on improving and developing technologies to maximize the economical efficiency as well as safety maintenance of nuclear power plant using the destructive and nondestructive approaches. In particular, evaluation of mechanical characteristics of materials by aging degradation due to corrosion, creep, and fatigue is actively investigated. In this paper, as a fundamental study to evaluate fracture characteristics and material degradation by corrosion, evaluated electrochemical corrosion and corrosion fatigue characteristics of CF8A steel using as a material of the piping system in nuclear power plant. CF8A steel was artificially aged at 400℃ for 3 months. The environmental test condition is 3.5wt.% NaCl solution of room temperature.

Temperature Dependence of Delayed Hydride Crack Velocity in Zr-2.5Nb Tubes

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Zr-2.5Nb 압력관에서 지연수소균열 진전속도의 온도의존성

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Key Words: Zr-2.5Nb pressure tubes (Zr-2.5Nb 압력관), Delayed Hydride Crack (지연수소균열)

Abstract : Delayed hydride crack (DHC) tests were conducted on Zr-2.5Nb tubes with different distributions of the β-Zr at temperatures ranging from 125 to 300 oC. Compact tension specimens charged to 27 to 100 ppm hydrogen were used to determine temperature dependences of their DHC velocity (DHCV) and their striation spacing. The Zr-2.5Nb tube with a higher yield strength and a semi-continuous β-Zr had a higher DHCV and a smaller striation spacing than that with a fully discontinuous β-Zr and a lower yield strength. It is found that the activation energy for the DHCV is the sum of the activation energies for hydrogen diffusion and the striation spacing representing the hydrogen concentration gradient at the crack tip. Quantitative contribution of hydrogen diffusion and the hydrogen concentration gradient to the DHCV is discussed. This study provides supportive evidence to the feasibility of Kim's DHC model.