주조용 17-4PH 스테인레스강의 내부 기공률과 기계적 물성과의 상관관계 분석

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Correlation Between Internal Casting Porosity and Mechanical Properties of 17-4PH Stainless Steel

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Key Words: 17-4PH, Casting Porosity(주조 기공률), Mechanical property(기계적물성), Electrical resistivity(전기비저항)

Abstract : Complex shaped components could be fabricated by casting process in order to improve the performance and economic efficiency for aircraft gas turbine engine. casting can reduce the manufacturing cost, however the service life could be reduced or unpredictable failure would be occurred because of internal casting defects that may be occurred during the process. Therefore, the defect and integrity evaluation on casting products are very important techniques in order to ensure the reliability of gas turbine engines. In this study, the specimens with internal casting defects made of 17-4PH stainless steel were prepared and evaluated for characterization based on volume fraction of casting porosity. The relation between mechanical properties and volume fraction of defect has been investigated. As a result of analysis, the mechanical properties of 17-4PH decreased as the defect volume fraction increased with very good linearity.

스프링으로 지지된 튜브의 프레팅 마멸에서 사이클 증가에 따른 접촉하중의 변화

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Variation of a Contacting Force with Increasing Cycle in the Fretting Wear of a Spring-Supported Tube

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Key Words: Nuclear fuel rod(핵연료 피복관), Fretting wear (프레팅 마멸), Spacer grid spring(지지격자 스프링), Contacting force(접촉하중), Cycle effect(사이클 영향)

Abstract : To evaluate the variation of contacting force during the fretting wear of a nuclear fuel rod, sliding wear tests were performed using two kinds of space grid springs in room temperature air. With increasing test cycle, a contacting force of a concave spring rapidly decreased, but gradually decreased in a convex spring. It is apparently shown that a spring with convex shape had a relatively high wear resistance and a supporting ability when compared with a concave shape spring. It is suggested that the spring shape, stiffness and wear debris behavior can play a major role in the wear resistibility of a nuclear fuel rod.