저압 함침법에 의한 경합금 복합재료의 최적 설계와 개발에 관한 연구

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Optimum process design of light metal alloy composite by low-pressure infiltration process and development

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Key Words : low-pressure casting, infiltration behavior, molten aluminum alloy, preform

Abstract : Metal fiber preform reinforced aluminum alloy composite were made by the infiltration of molten metal under low pressure casting process. The infiltration behavior of filling pattern and the velocity profile with low-pressure casting process was investigated. The thermocouple was inserted into the preform in order to observe the infiltration behavior. The infiltration of applied pressure time, 1s, 2s and 5s under constant pressure of 0.4MPa was completely filled during 0.4s. and it was observed the porosity of composites for reliability of composites,. It was developed the automobile piston with FeCrSi reinforced aluminum alloy that is 0% porosity by the optimal applied pressure and applied pressure time.

치과용 Ni-Cr 포스트 재료의 신뢰성 설계

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Design for Reliability on Dental Post Materials of Nickel-Chromium Alloy

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Key Words: Design for reliability(신뢰성설계), Dental post material(치과용 포스트 재료), Surface design(표면디자인), Bending strength(굽힘강도), Adhesive force(접착력)

Abstract : Surface design of dental post materials improves adhesive force between a post and a root dentin and has significant influences on the reliability in endodontically treated tooth. To investigate relationship between the design of shape and the strength of material, dental posts made of nickel- chromium alloy were prepared. Three-point bending test was performed using the post material, which is utilized actually in teeth treatment. The fracture surface of specimen was examined by Scanning Electron Microscope(SEM) through failure analysis. Based on experimental results, the numerical analysis was simulated using ABAQUS, one of commercial software. The bending strength of modified post material model is higher than that of custom post material model. The modified design of the dental post material was also proposed.