

단결정 압전재의 비선형 거동 모델링

김상주[†](서울시립대) · Stefan Seelecke^{*}(North Carolina State University)**Modeling of Nonlinear Behavior in Piezoelectric Single Crystals**

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Key Words: Piezoelectrics(압전재), Nonlinear(비선형), Thermal Activation(열활성화).

Abstract : A one-dimensional model with two energy wells is generalized to three dimensions from energy point of view so that it may predict the nonlinear behavior of piezoelectric single crystals under electric field or mechanical stress. In the proposed model, six free energy potentials in which six distinct types of tetragonal variants reside are given as quadratic functions of polarization vector and strain tensor. Energy barriers are given as functions of thermodynamic driving forces. The predictions of the model are compared with recent observations on a ferroelectric single crystal BaTiO₃. The effects of applied stress, 90- and 180-switching processes are discussed in detail.

우리나라가 국내 · 외 특허권을 소유한 가압경수로 연료용 지지격자 개발 현황

송기남[†](한국원자력연구소) · 이강희[†] · 강흥석[†] · 윤경호[†]**The Present Development Status of the Spacer Grid for PWR Fuels Patented by KOREA**

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Key Words: Spacer Grid(지지격자), Fuel Assembly(핵연료집합체), PWR(가압경수로)

Abstract : A spacer grid is one of the structural core components of nuclear fuel assemblies for Pressurized light Water Reactor (PWR)s. Since 1997, Korea Atomic Energy Research Institute (KAERI) has devised 16 kinds of spacer grid shapes and up to now acquired US, Japan, China, and Republic of Korea (ROK) patents for 15 kinds of spacer grid shapes from them. In this paper main features and patent status of KAERI designed spacer grid shapes were briefly described. In addition, the performance test and analysis results on the spacer grid shapes were introduced and discussed from the viewpoint of spring characteristics, fuel rod vibration characteristics, fretting wear resistance, impact characteristics of the spacer grids.