Modeling and characterization of hysteresis loops with Preisach hysteron weight modification

By: Momnor, T (Momnor, Teerawatt)¹,²,³; Kanchiang, K (Kanchiang, Kanokwan)¹,³; Yimninrun, R (Yimninrun, Ratikom)¹,²,³; Laosritawom, Y (Laosritawom, Yongyut)¹,⁴

INTEGRATED FERROELECTRICS
Volume: 175 Issue: 1 Pages: 33-43 Special Issue: SI
DOI: 10.1080/10584587.2016.1199929
Published: 2016
View Journal Information

Abstract
Preisach-based method was used to characterize a series of BaTiO3 hysteresis loops with varying external field frequencies. A stochastic adjustment of hysteron's weight was performed to obtain the Preisach densities. These densities, in representing the hysteresis responses, were characterized with three key parameters of the 3-dimensional hyperbolic-like distribution. One of the parameters relates directly to coercivity, while the other two concurrently represent polarization derivatives close to the coercivity, and emphasize an adaptability of the material to the external field around the main body of the loops. Thus, this approach can be extended to characterize other series of hysteresis loops to study changes of material responses influenced by varying external field frequency factor.

Keywords
Author Keywords: Preisach model; hysteresis loops; ferroelectrics; BaTiO3
KeyWords Plus: FERROELECTRIC CERAMICS; BARIUM-TITANATE; THIN-FILMS; SYSTEMS

Author Information
Reprint Address: Laosritawom, Y (reprint author)
Addresses:
E-mail Addresses: yongyut_laosritawom@yahoo.com

Funding
Funding Agency | Grant Number
--- | ---
Higher Education Research Promotion and National Research University Project of Thailand | 
Office of the Higher Education Commission | 
Suranaree University of Technology | 

View funding text

Publisher
TAYLOR & FRANCIS LTD, 2-4 PARK SQUARE, MILTON PARK, ABINGDON OR14 4RN, OXON, ENGLAND

Categories / Classification
Research Areas: Engineering; Physics
Web of Science Categories: Engineering, Electrical & Electronic; Physics, Applied; Physics, Condensed Matter

Document Information