

# Domains and Piezo-Images of PZT Family Thin Films Observed by AFM and KFM

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## Abstract

Ferroelectric material are very interesting functional materials which have piezoelectric, pyroelectric, non-linear electro-optic and polarization switching phenomena. PZT thin films have been potential application in ferroelectric random access memory (FeRAMs) and micro-electro mechanical systems (MEMS).

In this paper, The domain, piezo-images and piezo-electric properties of PZT films were investigated by AFM, KFM and laser Doppler equipment.

**Key words** : Ferroelectric Domains, PZT thin films, AFM, KFM

## 1. Introduction

Ferroelectric materials are very interesting functional materials which have piezoelectric, pyroelectric, nonlinear-optic and polarization switching phenomena for the dependence of applied electric field, temperature, stress and light beam irradiation, respectively.

PbZr<sub>1-x</sub>Ti<sub>x</sub>O<sub>8</sub> (PZT) thin film has been actively studied for it's potential application in ferroelectric random access memories (FeRAMs) and micro electro mechanical systems (MEMS). It is expected the micro-actuators to be applied piezoelectric properties, such as a precision optical axis control of optical apparatus, a precisions position control of micro robot and a blood control in a blood vessel, respectively. PZT thin films with repeated polarization switching endurance and voltage are desirable for these applications, respectively.

In the present study, PZT thin films with composition near the MPB were prepared by YAG : PLD system using bulk target source for control of the Pb content of the thin films.

The domain, piezo-images and piezo-electric properties were investigated using by AFM, KFM and laser Doppler equipment.

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