

# Ferroelectric Thin Films for MEMS Sensors and Actuators

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Keywords: Thin Films, Pyroelectric Sensors, Energy Harvester, Sensors Network Module

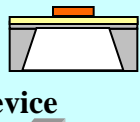
## Abstract

- ◆ Ferroelectric thin films for pyroelectric sensors and energy harvesting devices have been fabricated by sputter technique.

## Final Target

## Integrated Sensors Network Module

1) Temperature Sensor



2) EH Device



3) LSI for Signal



4) LSI for Wireless Communication



Consumption Power of  
Temp. sensor: <math><10\mu\text{W}</math>  
(Resolution :>2C)  
EH device: >15uW

## Target of This Project

Development of Fabrication Technique for Ferroelectric Thin films

- 1) Lead-free ferroelectric  $\text{BaTiO}_3$  thin films by sputtering
- 2) Transformation of ferroelectric films on glass and polymer substrate

## Experimental Results

### Lead-free BTO thin film on MgO

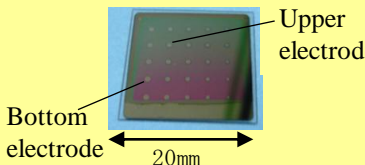


Fig. 1. OM Photograph of Sputtered  $\text{BTO}_3$  film.

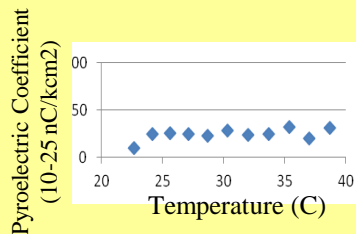


Fig. 2. Pyroelectric constant of  $\text{BTO}_3$  film.

## Summary

- 1) Lead-free  $\text{BaTiO}_3$  film showed high pyroelectric coefficient.
- 2) PZT films with perovskite structure were successfully transferred on glass substrates by laser lift off technique.

### Laser lift off

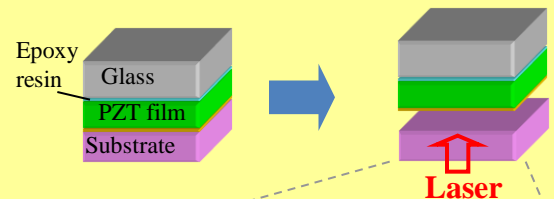


Fig. 3. Image of laser lift off.

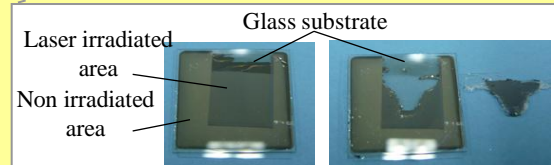


Fig. 4. Photographs of after laser irradiated film.