

# Fabrication and dielectric properties of $(\text{Ba}_{0.8}\text{Sr}_{0.2})(\text{Zr}_x\text{Ti}_{1-x})\text{O}_3$ thin films by pulsed laser deposition

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## Abstract

Thin films of  $(\text{Ba}_{0.8}\text{Sr}_{0.2})(\text{Zr}_x\text{Ti}_{1-x})\text{O}_3$  ( $x = 0, 0.08, 0.18, 0.36$ ) were grown on Pt/TiO<sub>2</sub>/SiO<sub>2</sub>/ Si substrate at 550 °C by pulsed laser deposition technique. XRD patterns show that the thin films are well crystallized into perovskite structure. Electric properties of the thin films, including dielectric constant, dielectric loss, tunability, polarization loops, and leakage current, were investigated. With increasing Zr content, the tunability of dielectric constant and ferroelectric polarization are decreased and the ferroelectricity of the thin films is disappeared. Significantly, it is found that the dielectric loss and leakage current of thin films can be reduced by the substitution of Ti with Zr. Furthermore, the leakage current is decreased about three-order of magnitude for electric field of 100 kV/cm with increasing Zr content. The improved dielectric loss and leakage current will be significant for the use of environmental friendly material in devices.

**Keywords:** thin films, dielectric properties, perovskite,  $(\text{Ba},\text{Sr})(\text{Zr},\text{Ti})\text{O}_3$

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